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7700FR

**MULTIFRAME  
MANUAL**

Version 2.3  
01/02

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## **1. INSTALLING AND REMOVING THE MODULES**

### **1.1. INSTALLING THE MODULE REAR PLATES**

Each module is shipped with a matching rear panel plate which houses the connectors appropriate for the module. When installing a rear plate, locate the desired slot position where you wish to install the rear plate. Make a note of the slot number where you are installing the rear plate. Orient the plate so that the labeling is visible when the plate is installed. Loosely fasten the plate to the extrusions using the mounting screws provided, beginning with the top screw. You will tighten the screws after the main module is installed.

### **1.2. OPENING AND CLOSING THE FRONT PANEL**

In order to insert or remove modules you will have to open the front panel. Turn the two captive screws located on the front panel counter clockwise several turns until they release completely from the front extrusions. Carefully lower the front panel door so that the front edge of the door is lower than the rear of the door.

### **1.3. INSTALLING THE MODULES**

Orient the module vertically such that the white card ejector is on the bottom. Align the card with the card guide corresponding to the slot number where you installed the rear panel plate. Carefully slide the module into the frame and press it completely into the rear panel connectors. Make sure that the connectors are fully seated in the rear panel. When this is done, close the front panel and then tighten the screws that hold the rear panel in place.

### **1.4. REMOVING THE MODULES**

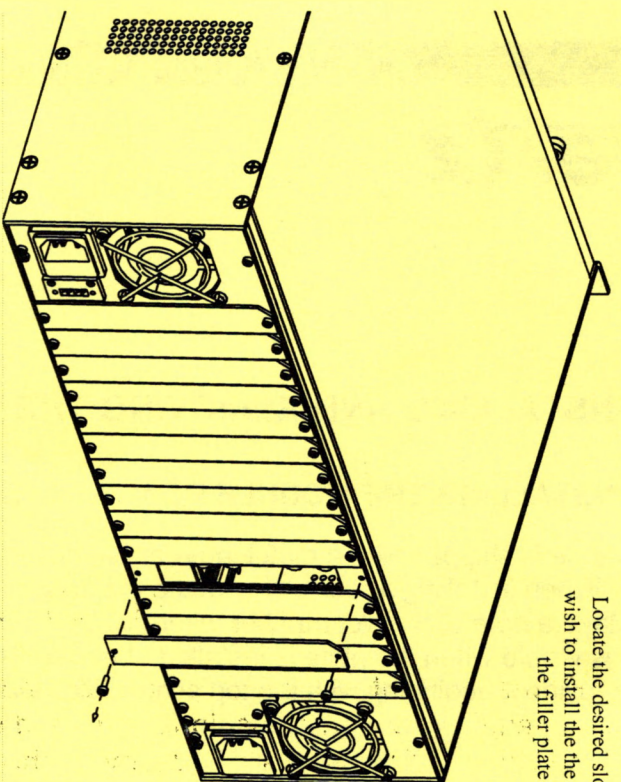
Press the card ejector down to release the module. Grasp the card using the card ejector and pull the module out from the frame. As the card ejector goes past the front extrusion, you will have to pull it with slightly more force. Carefully place the module in a safe place, free from static discharge.



# 7700FR-C MODULE INSTALLATION GUIDE

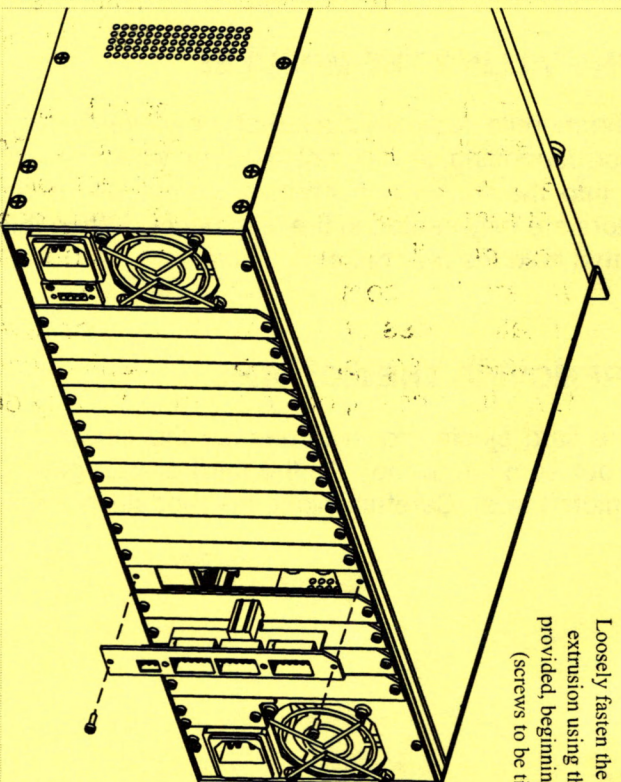
## STEP 1

Locate the desired slot position where you wish to install the rear plate and remove the filler plate from that slot.



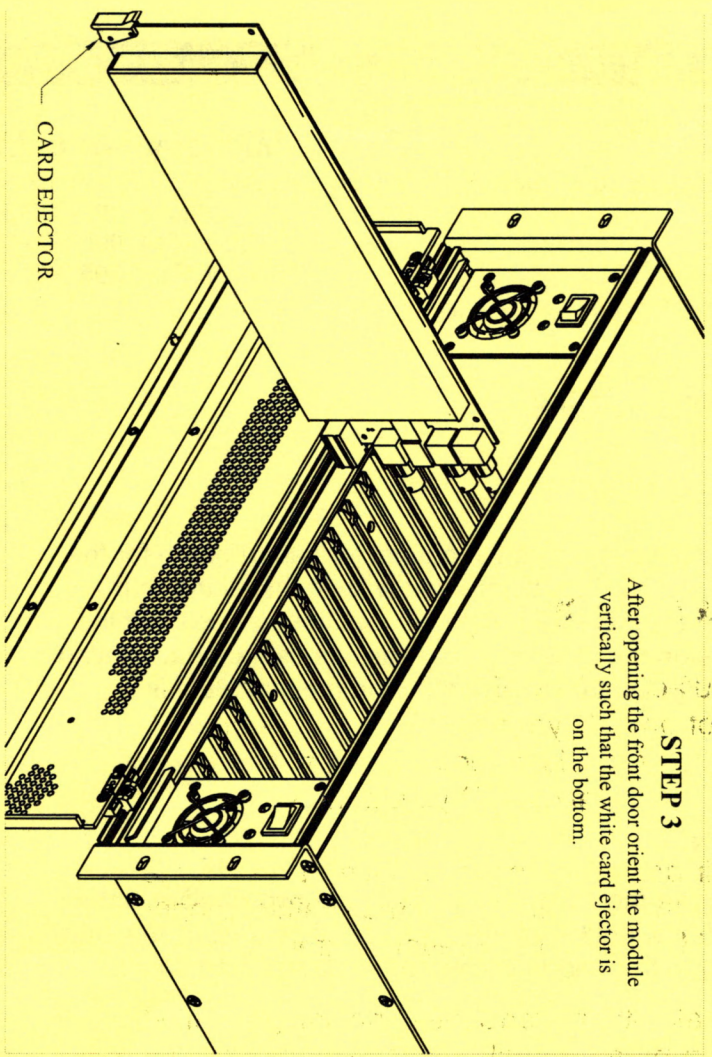
## STEP 2

Loosely fasten the new rear plate to the extrusion using the mounting screws provided, beginning with the top screw. (screws to be tighten on Step 4)



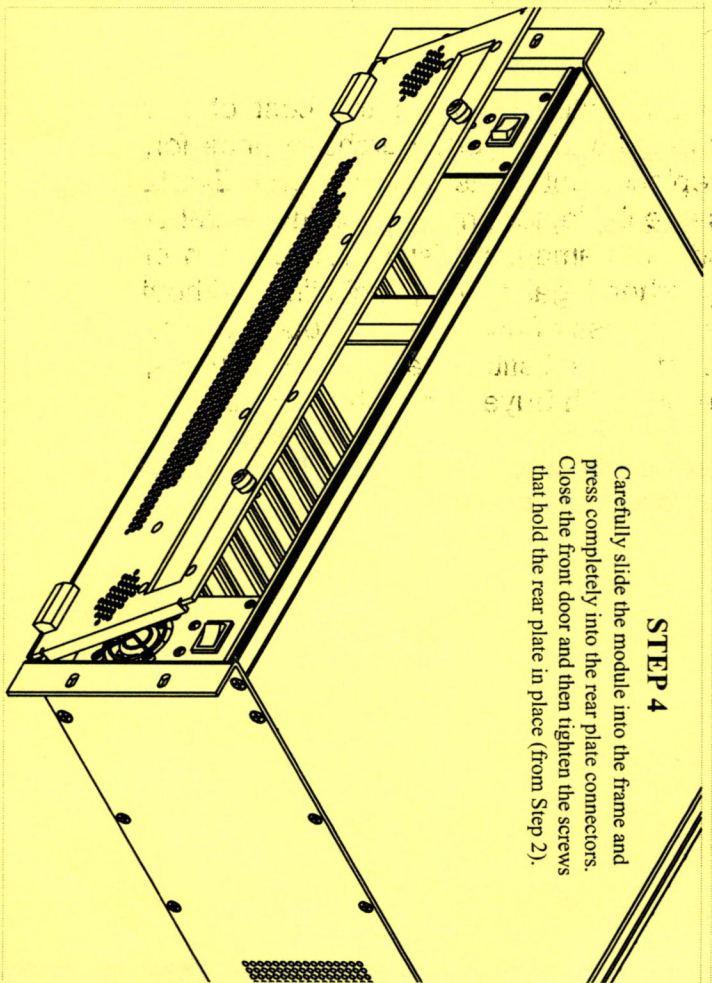
## STEP 3

After opening the front door orient the module vertically such that the white card ejector is on the bottom.



## STEP 4

Carefully slide the module into the frame and press completely into the rear plate connectors. Close the front door and then tighten the screws that hold the rear plate in place (from Step 2).



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# **7700 MultiFrame**

## **Instruction Manual**

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Version 2.3, January 2002

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## **INFORMATION TO USERS IN EUROPE**

### **NOTE**

#### **CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## **INFORMATION TO USERS IN THE U.S.A.**

### **NOTE**

#### **FCC CLASS A DIGITAL DEVICE OR PERIPHERAL**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### **WARNING**

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.



**REVISION HISTORY**

<b><u>REVISION</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>DATE</u></b>
Preliminary	Preliminary Chapters	April 99
1.0	Initial release of individual sections: Overview, Selector Guide, 7700FR Frame, Fiber Optics System Design, Upgrading Firmware 7700DA-HD, 7705OE-HD, 7705EO-HD, 7710MD, 7720AD-HD, 7720AE-HD 7700DA, 7705OE, 7705EO	June 99
1.1.	New release of various chapters and updated chapters 7700DA-HD, 7705EO-HD, 7705OE-HD, 7720AE-HD & 7720AD-HD	Sept. 99
2.0	New release of various chapters and updated chapters, 7750SRG-HD, 7720AD, 7720AE, 7700ADA, 7750TG, 7760AVM-LITE	May 00
2.1	New release of various chapters: 7721DD, 7721DE, 7700FC, 7730DAC-HD, 7732PFT-HD, 7760AVM and updated various chapters	July 00
2.2	New release of various chapters: 7700DA-AES, 7700DA-DS3, 7705AR, 7705AT, 7705DT, 7705OO, 7705OO-HD, 7735AVC 7745FS-HD, 7750SSG, 7750TG2-HD and updated various chapters	June 01
2.3	Added 7707CVR/T, 7707EO/OE, 7707MR/MT, 7707VAR/VAT, 7707ET 7735CD, 7735CE, 7745FS, 7740DLY, 7761AVM-DC, 7765AVM-4 New versions of 7720AD, and 7720AE and various other modules Updated Product Selector Guide	Jan 02



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**REVISION HISTORY**

<b><u>REVISION</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>DATE</u></b>
1.0	Original Version	June 99
1.1	Added information on 7701 Frame and stand alone enclosures	Sept 00



## 1. OVERVIEW

The Evertz 7700 Series Modules provide solutions for today's vast digital requirements while at the same time providing the ability and flexibility to handle the high-speed requirements of high definition television signals both now and in the future. The system can handle a wide variety of signal formats and interfaces including analog audio and video, AES audio, standard definition (SDI) and high definition (HDTV) video with either coaxial copper or fiber optic interfaces concurrently in the same frame.

The 7700FR 3RU frame permits extraction of the modules from the front without compromising performance even at 1.5Gb/s. Thus, there is no need for time consuming re-cabling nor is there need to have access to the rear of the frame replace or exchange modules. This advanced rack frame design can house up to 15 modules of any combination of the 7700 series distribution, conversion, processing and synchronization. Special attention was provided to ensure sufficient thermal relief for up to 160 watts of processing power. Choose the number and the type of modules to meet your system design requirements today and if the future requires additional modules or a change of module to a higher speed upgrade (say HDTV) it is achieved via simple front loading.

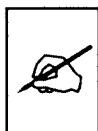
The 7701 1RU frame encompasses the same design philosophy as the larger frame. This compact rack frame design can house up to 3 modules of any combination of the 7700 series distribution, conversion, processing and synchronization. Special attention was provided to ensure sufficient thermal relief for up to 60 watts of processing power. The 7701 frame contains a single power supply.

Many of the modules are also available in a stand-alone enclosure. Each stand alone unit is self contained and is powered from an external 12VDC source. A mains to 12 VDC power supply is included when you purchase the unit. These units are ideal where single module is required, or where 12 volt power is available in field applications. Stand alone units each have their own manual which consists of general information plus the relevant chapter from this binder.

### 1.1. HOW TO USE THIS MANUAL

This manual is organized in a modular format and consists of an overview chapter, and separate chapters for the rack frame and each module in the 7700 series. The overview section contains a short tutorial and glossary to define concepts and terms used throughout the remainder of the manual. We highly recommend taking the time to become familiar with the terms and concepts described here before proceeding into the rest of the manual.

The 7700 or 7701 Frame chapter will be included depending on the frame that you ordered. This chapter gives a detailed description of the rack frame and power supplies and gives general mounting and installation instructions. Each of the individual module chapters is a stand alone document that describes the function, installation, and operation of a specific module. Index divider tabs, used in conjunction with the selector guide chapter will quickly guide you to the appropriate part of the manual.



Items of special note are indicated with a double box like this.



## **1.2. GLOSSARY**

### **1.2.1. Definitions**

**CCIR-601** (This document now known as ITU-R601). An international standard for component digital television from which was derived SMPTE 125M and EBU 3246-E standards. CCIR-601 defines the sampling systems, matrix values and filter characteristics for both Y, B-Y, R-Y and RGB component digital television signals.

**SERIAL DIGITAL** Digital information that is transmitted in serial form. Often used informally to refer to serial digital television signals.

**4:2:2** A commonly used term for a component digital video format. The details of the format are specified in the CCIR-601 standard. The numerals 4:2:2 denote the ratio of the sampling frequencies of the luminance channel to the two colour difference channels. For every four luminance samples, there are two samples of each colour difference channel.

**SDI** An abbreviation for *serial digital interface*, this acronym is most commonly used to refer to Standard definition serial digital television video signals up to 540 Mb/s.

**HDTV** An abbreviation for *high definition television*, this acronym is most commonly used to refer to High definition serial digital television video signals at 1.485 Gb/s.

**AES:** (Audio Engineering Society): A professional organization that recommends standards for the audio industries.

**AES/EBU:** Informal name for a digital audio standard established jointly by the Audio Engineering Society and the European Broadcasting Union organizations.

**ANALOG:** An adjective describing any signal that varies continuously as opposed to a digital signal that contains discrete levels representing digits 0 and 1.

**A-TO D CONVERTER (ANALOG-TO-DIGITAL):** A circuit that uses digital sampling to convert an analog signal into a digital representation of that signal.

**BIT:** A binary representation of 0 or 1. One of the quantized levels of a pixel.

**BIT PARALLEL:** Byte-wise transmission of digital video down a multi-conductor cable where each pair of wires carries a single bit. This standard is covered under SMPTE 125M, EBU 3267-E and CCIR 656.

**BIT SERIAL:** Bit-wise transmission of digital video down a single conductor such as coaxial cable. May also be sent through fiber optics. This standard is covered under SMPTE 259M and CCIR 656.

**BIT STREAM:** A continuous series of bits transmitted on a line.

**BYTE:** A complete set of quantized levels containing all the bits. Bytes consisting of 8 to 10 bits per sample are typical in digital video systems.

**CABLE EQUALIZATION:** The process of altering the frequency response of a video amplifier to compensate for high frequency losses in coaxial cable.

**CCIR (International Radio Consultative Committee)** An international standards committee. (This organization is now known as ITU.)

**CCIR-601:** (This document now known as ITU-R601). An international standard for component digital television from which was derived SMPTE 125M and EBU 3246-E standards. CCIR-601 defines the sampling systems, matrix values and filter characteristics for both Y, B-Y, R-Y and RGB component digital television signals.

**CCIR-656** (This document now known as ITU-R656). The physical parallel and serial interconnect scheme for CCIR-601. CCIR-656 defines the parallel connector pinouts as well as the blanking, sync and multiplexing schemes used in both parallel and serial interfaces. It reflects definitions found in EBU Tech 3267 (for 625 line systems) and SMPTE 125M (parallel 525 line systems) and SMPTE 259M (serial 525 line systems).

**CLIFF EFFECT** (also referred to as the 'digital cliff') This is a phenomenon found in digital video systems that describes the sudden deterioration of picture quality due to excessive bit errors, often caused by excessive cable lengths. The digital signal will be perfect even though one of its signal parameters is approaching or passing the specified limits. At a given moment however, the parameter will reach a point where the data can no longer be interpreted correctly, and the picture will be totally unrecognizable.

**COMPONENT ANALOG:** The non-encoded output of a camera, video tape recorder, etc., consisting of the three primary colour signals: red, green, and blue (RGB) that together convey all necessary picture information. In some component video formats these three components have been translated into a luminance signal and two colour difference signals, for example Y, B-Y, R-Y.

**COMPONENT DIGITAL:** A digital representation of a component analog signal set, most often Y, B-Y, R-Y. The encoding parameters are specified by CCIR-601. The parallel interface is specified by CCIR-656 and SMPTE 125M.

**COMPOSITE ANALOG:** An encoded video signal such as NTSC or PAL video, that includes horizontal and vertical synchronizing information.

**COMPOSITE DIGITAL:** A digitally encoded video signal, such as NTSC or PAL video that includes horizontal and vertical synchronizing information.

**D1:** A component digital video recording format that uses data conforming to the CCIR-601 standard. Records on 19 mm magnetic tape. (Often used incorrectly to refer to component digital video.)

**D2:** A composite digital video recording format that uses data conforming to SMPTE 244M. Records on 19 mm magnetic tape. (Often used incorrectly to refer to composite digital video.)

**D3:** A composite digital video recording format that uses data conforming to SMPTE 244M. Records on 1/2" magnetic tape.

**EBU (European Broadcasting Union):** An organization of European broadcasters that among other activities provides technical recommendations for the 625/50 line television systems.



## 7700 MultiFrame Manual

### Overview

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**EBU TECH 3267-E:** The EBU recommendation for the parallel interface of 625 line digital video signal. This is a revision of the earlier EBU Tech 3246-E standard that was in turn derived from CCIR-601.

**EDH:** Error Detection and Handling (EDH) is defined in SMPTE RP-165 as a method of determining when bit errors have occurred along the digital video path. According to RP-165, two error detection checkwords are used, one for active picture samples, and the other on a full field of samples. Three sets of flags are used to convey information regarding detected errors, to facilitate identification of faulty equipment or cabling. One set of flags is associated with each checkword, and the third is used to evaluate ancillary data integrity. The checkwords and flags are combined into a special error detection data packet that is included as ancillary data in the serial digital signal.

**EMBEDDED AUDIO:** Digital audio is multiplexed onto a serial digital video data stream.

**ITU:** The United Nations regulatory body governing all forms of communications. ITU-R (previously CCIR) regulates the radio frequency spectrum, while ITU-T (previously CCITT) deals with the telecommunications standards.

**ITU-R601:** See CCIR601

**PIXEL:** The smallest distinguishable and resolvable area in a video image. A single point on the screen. In digital video, a single sample of the picture. Derived from the words *picture element*.

**RESOLUTION:** The number of bits (four, eight, ten, etc.) determines the resolution of the signal. Eight bits is the minimum resolution for broadcast television signals.

4 bits = a resolution of 1 in 16.

8 bits = a resolution of 1 in 256.

10 bits = a resolution of 1 in 1024.

**SERIAL DIGITAL:** Digital information that is transmitted in serial form. Often used informally to refer to serial digital television signals.

**SMPTE (Society of Motion Picture and Television Engineers):** A professional organization that recommends standards for the film and television industries.

**SMPTE 125M:** The SMPTE standard for bit parallel digital interface for component video signals. SMPTE 125M defines the parameters required to generate and distribute component video signals on a parallel interface.

**SMPTE 244M:** The SMPTE standard for bit parallel digital interface for composite video signals. SMPTE 244M defines the parameters required to generate and distribute composite video signals on a parallel interface.

**SMPTE 259M:** The SMPTE standard for 525 line serial digital component and composite interfaces.

**SMPTE 292M:** The SMPTE standard for 1125 line serial digital high definition video interfaces.

**SMPTE 299M:** The SMPTE standard for embedding AES audio into SMPTE 292M serial digital high definition video.

**TRS-ID:** Abbreviation for "Timing Reference Signal Identification". A reference signal used to maintain timing in composite digital systems. (It is four words long in the serial data stream.)

**4Fsc:** Four times subcarrier sampling rate uses in composite digital systems. In NTSC this is 14.3 MHz. In PAL this is 17.7 MHz.



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## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	Original Version	June 99
1.1	Added 7705WDM, 7705DS, 7705MS, 7740DLY, 7760AVM series	Sept 99
1.2	Added 7740TMR, 7710MD-S, 7705OE-HD-L Added Modules by Model Number table	Oct 99
1.3	Added 7732PFT-HD	Jan 00
1.4	Added 7750SRG-HD HD Slave Reference Generator 7750TG SDI Test Signal Generator 7700ADA Analog Distribution Amplifier 7710MD-HSN HD Monitoring Down converter 4 HD, 2 SDI, 2 Analog outputs 7730DAC-HD, 7730DAC-HD-V, 7730DAC-HD-V-A HD D to A converters	Mar 00
1.5	Added 7700FC Frame Controller 7745FS SDI Frame Synchronizer 7745FS-HD HD Frame Synchronizer 7760 AVM-G, 7760 AVM-LITE Monitoring Deleted 7730DAC-HD-V-A, 7710MD-HAN Corrected model numbers for 7700DA10, 7700DA8-HD, 7705EO15-HD-L	Jun 00
1.6	Added 7700DA10-N Non-reclocking high fanout DA	Sep 00
1.7	Added Coarse Wave Division Multiplexing Fiber modules 7705OO Fiber wavelength Converter 7705AR/AT/DT/ET Fiber Audio/Data/Ethernet Transmitter/Receiver 7735AVC Audio/Video Converter 7750SSG Slave Sync Generator Updated specs on all fiber modules	Feb 01
1.8	Added 7707CVR/T, 7707EO/OE, 7707MR/MT, 7707VAR/VAT, 7707ET 7735CD, 7735CE, 7745FS, 7740DLY, 7761AVM-DC, 7765AVM-4 New versions of 7720AD, and 7720AE and various other modules	Jan 02
1.8.1	Added 7707OE-DS3	Feb 02

## 1. MODULES BY VIDEO STANDARD

The modules listed in this section are organized by Video Standard then sub-sorted by function

### 1.1. HIGH DEFINITION TELEVISION PRODUCTS

Model	Description	Chapter
7700DA-HD	1.5Gb/s 4 output HD DA (non reclocking for 19.4-540Mb/s)	7700DA-HD
7700DA8-HD	1.5Gb/s 8 output HD DA (non reclocking for 19.4-540Mb/s)	7700DA-HD
7705CWDM-D4	Fiber Optic Coarse Wavelength Division Demultiplexor – four wavelengths	Passive Optical
7705CWDM-D8	Fiber Optic Coarse Wavelength Division Demultiplexor – eight wavelengths	Passive Optical
7705CWDM-M4	Fiber Optic Coarse Wavelength Division Multiplexor – four wavelengths	Passive Optical
7705CWDM-M8	Fiber Optic Coarse Wavelength Division Multiplexor – eight wavelengths	Passive Optical
7705DS	Fiber Optic Splitter/Combiner – Splits single wavelength signal to two signals of 50% power, Combines two wavelengths to one signal	Passive Optical
7705DS-8	Fiber Optic Splitter/Combiner – Splits single wavelength signal to eight signals of 12.5% power, Combines eight wavelengths to one signal	Passive Optical
7705EO13-HD	Electrical to fiber Converter – 1310 nm – distances to 6 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705EO13-HD-L	Electrical to fiber Converter – 1310 nm, – distances to 40 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705EO15-HD-L	Electrical to fiber Converter – 1550 nm, – distances to 50 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705Eoxx-HD	Electrical to fiber Converter – CWDM, , – distances to 50 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705MS	Fiber Optic Monitoring Splitter – Splits single wavelength signal to two signals of 80%/20% power	Passive Optical
7705OE-HD	Fiber to electrical Converter – 1310 to 1610 nm, TX rates up to 1.5 Gb/s	7705OE-HD
7705OE-HD-L	Fiber to electrical Converter – 1310 to 1610 nm, TX rates up to 1.5 Gb/s – high sensitivity	7705OE-HD
7705OO13	Fiber Optic Wavelength Converter – 1310 nm, TX rates up to 540Mbit/s	7705OO
7705OO15	Fiber Optic Wavelength Converter – 1550 nm, TX rates up to 540Mbit/s	7705OO
7705OOxx	Fiber Optic Wavelength Converter – CWDM, TX rates up to 540Mbit/s	7705OO
7705OO13-HD	Fiber Optic Wavelength Converter – 1310 nm, TX rates up to 1.5 Gb/s	7705OO-HD
7705OO13-HD-L	Fiber Optic Wavelength Converter – 1310 nm, TX rates up to 1.5 Gb/s – extra long haul	7705OO-HD
7705OO15-HD-L	Fiber Optic Wavelength Converter – 1550 nm, TX rates up to 1.5 Gb/s – extra long haul	7705OO-HD
7705OOxx-HD	Fiber Optic Wavelength Converter – CWDM, TX rates up to 1.5 Gb/s – extra long haul	7705OO-HD
7705WDM	Fiber Optic wavelength division multiplexor/demultiplexor – Allows use of single fiber for transmission of two signals at different wavelengths	Passive Optical
7707BPX	Optical Bypass Switch with VistaLINK	7707BPX
7707EO13-HD	Electrical to fiber Converter - 1310 nm – distances to 6 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707EO13-HD-L	Electrical to fiber Converter - 1310 nm, – distances to 40 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD



Model	Description	Chapter
7707EO15-HD-L	Electrical to fiber Converter - 1550 nm, – distances to 50 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707EOxx-HD	Electrical to fiber Converter - CWDM, , – distances to 50 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707OE-HD	Fiber to electrical Converter - 1310 to 1610 nm, TX rates up to 1.5 Gb/s with VistaLINK	7707OE-HD
7710MD- HN	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 Analog output	7710MD
7710MD- HN-SF	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 Analog output - with 1080p/24sF support	7710MD
7710MD- HSN	HD monitoring down converter – 1.5 Gb/s input, 4 HD reclocked outputs, 2 SDI , 2 Analog outputs	7710MD
7710MD- HSN-SF	HD monitoring down converter – 1.5 Gb/s input, 4 HD reclocked outputs, 2 SDI , 2 Analog outputs - with 1080p/24sF support	7710MD
7710MD- S	HD monitoring down converter – 1.5 Gb/s input, 4 SDI outputs	7710MD
7710MD- SN	HD monitoring down converter – 1.5 Gb/s input, 2 SDI , 2 Analog outputs	7710MD
7710MD- SN-SF	HD monitoring down converter – 1.5 Gb/s input, 2 SDI , 2 Analog outputs - with 1080p/24sF support	7710MD
7710MD- S-SF	HD monitoring down converter – 1.5 Gb/s input, 4 SDI outputs - with 1080p/24sF support	7710MD
7710MD-HS	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 SDI outputs	7710MD
7710MD-HS-SF	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 SDI outputs - with 1080p/24sF support	7710MD
7720AD-HD	HD AES Audio De-embedder – 2 AES Outputs	7720AD-HD
7720AD4-HD	HD AES Audio De-embedder – 4 AES Outputs	7720AD-HD
7720AE-HD	HD AES Audio Embedder – 2 AES Inputs	7720AE-HD
7720AE3-HD	HD AES Audio Embedder – 3 AES Inputs	7720AE-HD
7730DAC-HD	HD D to A Converter: YprPb/RGB & Sync – BNC Outputs	7730DAC-HD
7730DAC-HD-V	HD D to A Converter: VGA Output & GPI – DB15	7730DAC-HD
7732PFT-HD	HD Progressive Format Translator 1080p/24sF Input, 1080i/60 output	7732PFT-HD
7745FS-HD	HD Frame Synchronizer	7745FS-HD
7745FS-HD-AES	HD Frame Synchronizer with 2 channels of AES	7745FS-HD
7750SRG-HD	HD Slave Reference Generator – 4 Sync outputs	7750SRG-HD
7750TG2-HD	HD 4:2:2 / 4:4:4 Test Generator with Embedded Audio	7750TG2-HD
7750TG-HD	HD Test Generator with Embedded Audio - 4 outputs	7750TG-HD
7750TG-TS	DVB-ASI/SMPTE 310M Test Generator	7750TG-TS

## 1.2. STANDARD DEFINITION TELEVISION PRODUCTS

Model	Description	Chapter
7700DA	SDI 4 output DA, reclocks 19.4, 143, 177, 270, 360 & 540Mb/s	7700DA
7700DA10	SDI 10 output DA, reclocks 19.4, 143, 177, 270, 360 & 540Mb/s	7700DA10
7700SID	Composite digital Source ID decoder	7700SID-AM
7700SID-AM	Composite digital Source ID decoder - Audio Monitor	7700SID-AM
7705CWDM-D4	Fiber Optic Coarse Wavelength Division Demultiplexor – four wavelengths	Passive Optical
7705CWDM-D8	Fiber Optic Coarse Wavelength Division Demultiplexor – eight wavelengths	Passive Optical
7705CWDM-M4	Fiber Optic Coarse Wavelength Division Multiplexor – four wavelengths	Passive Optical

Model	Description	Chapter
7705CWDM-M8	Fiber Optic Coarse Wavelength Division Multiplexor – eight wavelengths	Passive Optical
7705DS	Fiber Optic Splitter/Combiner – Splits single wavelength signal to two signals of 50% power, Combines two wavelengths to one signal	Passive Optical
7705DS-8	Fiber Optic Splitter/Combiner – Splits single wavelength signal to eight signals of 12.5% power, Combines eight wavelengths to one signal	Passive Optical
7705EO13	Electrical to fiber Converter – 1310 nm – distances to 50 Km, TX rates up to 540Mbit/s	7705EO
7705EO15	Electrical to fiber Converter – 1550 nm – distances to 75 Km, TX rates up to 540Mbit/s	7705EO
7705EOxx	Electrical to fiber Converter – CWDM – distances to 75 Km, TX rates up to 540Mbit/s	7705EO
7705MS	Fiber Optic Monitoring Splitter – Splits single wavelength signal to two signals of 80%/20% power	Passive Optical
7705OE	Fiber to electrical Converter – 1310 to 1610 nm, TX rates up to 540Mbit/s	7705OE
7705OO13	Fiber Optic Wavelength Converter – 1310 nm, TX rates up to 540Mbit/s	7705OO
7705OO15	Fiber Optic Wavelength Converter – 1550 nm, TX rates up to 540Mbit/s	7705OO
7705OOxx	Fiber Optic Wavelength Converter – CWDM, TX rates up to 540Mbit/s	7705OO
7705WDM	Fiber Optic wavelength division multiplexor/demultiplexor – Allows use of single fiber for transmission of two signals at different wavelengths	Passive Optical
7707BPX	Optical Bypass Switch with VistaLINK	7707BPX
7707EO13	Electrical to fiber Converter - 1310 nm – distances to 50 Km, TX rates up to 540Mbit/s with VistaLINK	7707EO
7707EO15	Electrical to fiber Converter - 1550 nm – distances to 75 Km, TX rates up to 540Mbit/s with VistaLINK	7707EO
7707EOxx	Electrical to fiber Converter - CWDM – distances to 75 Km, TX rates up to 540Mbit/s with VistaLINK	7707EO
7707MR13	Multi-Signal Fiber Receiver (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1310 nm	7707MR
7707MR13-A4	Multi-Signal Fiber Receiver (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1310 nm	7707MR
7707MR15	Multi-Signal Fiber Receiver (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1550 nm	7707MR
7707MR15-A4	Multi-Signal Fiber Receiver (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1550 nm	7707MR
7707MRxx	Multi-Signal Fiber Receiver (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on CWDM wavelengths	7707MR
7707MRxx-A4	Multi-Signal Fiber Receiver (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on CWDM wavelengths	7707MR
7707MT13	Multi-Signal Fiber Transmitter (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1310 nm	7707MT
7707MT13-A4	Multi-Signal Fiber Transmitter (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1310 nm	7707MT
7707MT15	Multi-Signal Fiber Transmitter (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1550 nm	7707MT
7707MT15-A4	Multi-Signal Fiber Transmitter (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1550 nm	7707MT
7707MTxx	Multi-Signal Fiber Transmitter (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - CWDM	7707MT

<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7707MTxx-A4	Multi-Signal Fiber Transmitter (SDI Video +4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - CWDM	7707MT
7707OE	Fiber to electrical Converter - 1310 to 1610 nm, TX rates up to 540Mbit/s with VistaLINK	7707OE
7707VAR	SDI Video + 2 AES Audio Fiber Receiver with VistaLINK	7707VAR
7707VAR-4	Quad SDI Video + 8 AES Audio Fiber Receiver with VistaLINK	7707VAR
7707VAT13	SDI Video + 2 AES Audio Fiber Transmitter 1310 nm with VistaLINK	7707VAT
7707VAT15	SDI Video + 2 AES Audio Fiber Transmitter 1550 nm with VistaLINK	7707VAT
7707VATxx	SDI Video + 2 AES Audio Fiber Transmitter CWDM with VistaLINK	7707VAT
7707VAT13-4	Quad SDI Video + 8 AES Audio Fiber Transmitter 1310 nm with VistaLINK	7707VAT
7707VAT15-4	Quad SDI Video + 8 AES Audio Fiber Transmitter 1550 nm with VistaLINK	7707VAT
7707VATxx-4	Quad SDI Video + 8 AES Audio Fiber Transmitter CWDM with VistaLINK	7707VAT
7720AD	SDI AES Audio De-embedder - 2 Unbalanced AES Outputs	7720AD
7720AD-A4	SDI AES Audio De-embedder - 2 AES & 4 Analog Audio Outputs	7720AD
7720AD-OE	SDI AES Audio De-embedder with optical input - 2 AES Outputs	7720AD
7720AD4	SDI AES Audio De-embedder – 4 Unbalanced AES Outputs	7720AD
7720AD4-B	SDI AES Audio De-embedder – 4 Balanced AES Outputs	7720AD
7720AE	SDI AES audio embedder – 2 AES Inputs	7720AE
7720AE3	SDI AES audio embedder – 3 AES Inputs	7720AE
7720AE-EO	SDI AES audio embedder with Optical output 1310 nm – 2 AES Inputs	7720AE
7721DD	SDI Data De-embedder	7721DD
7721DE	SDI Data Embedder	7721DE
7721GPI-D	GPI Receiver	7721D-AES
7725VBI-K	VBI Signal Inserter	7721D-AES
7735AVC-LB	SDI to NTSC/PAL Encoder with Line Buffer and Audio and Fault Monitoring with VistaLINK	7735AVC
7735CDM	NTSC/PAL to SDI Decoder with Frame Synchronizer and Analog OSD Monitoring with VistaLINK	7735CD
7735CDM-A4	NTSC/PAL to SDI Decoder with Frame Synchronizer, 4 channel audio A/D & multiplexor and Analog OSD Monitoring with VistaLINK	7735CD
7735CDM-AES	NTSC/PAL to SDI Decoder with Frame Synchronizer, 2 channel AES multiplexor and Analog OSD Monitoring with VistaLINK	7735CD
7735CDS	NTSC/PAL to SDI Decoder with Frame Synchronizer and SDI OSD Monitoring with VistaLINK	7735CD
7735CDS-A4	NTSC/PAL to SDI Decoder with Frame Synchronizer, 4 channel audio A/D & multiplexor and SDI OSD Monitoring with VistaLINK	7735CD
7735CDS-AES	NTSC/PAL to SDI Decoder with Frame Synchronizer, 2 channel AES multiplexor and SDI OSD Monitoring with VistaLINK	7735CD
7735CE	SDI to NTSC/PAL Encoder with Frame Synchronizer with VistaLINK	7735CE
7735CE-A4	SDI to NTSC/PAL Encoder with Frame Synchronizer and 4 ch audio demux & D/A with VistaLINK	7735CE
7735CEM	SDI to NTSC/PAL Encoder with Frame Synchronizer and Analog OSD Monitoring with VistaLINK	7735CE
7735CEM-A4	SDI to NTSC/PAL Encoder with Frame Synchronizer, 4 ch audio demux & D/A and Analog OSD Monitoring with VistaLINK	7735CE
7740DLY	SDI Delay – 0 to .5 sec delay and selectable VBI blanking	7740
7742DLY	SDI Delay – 0 to 2.33 sec delay and selectable VBI blanking	7740



<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7745FS	SDI Frame Synchronizer	7745FS
7745FS-AES	SDI Frame Synchronizer with 2 channels of AES	7745FS
7750SSG	SD Slave Sync Generator - Colour Frame ID and 2 Sync outputs with colour burst	7750SSG
7750SSG-4	SD Slave Sync Generator - 4 Sync outputs with colour burst	7750SSG
7750TG	SDI Test Generator with Embedded Audio – 4 outputs	7750TG
7760AVM-A	SDI Video and Audio Monitor – SDI input with embedded audio, 1 reclocked SDI output, 1 composite analog output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-B	SDI Video and Audio Monitor – SDI input with embedded audio, 1 reclocked SDI output, 1 SDI output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-C	SDI Video and Audio Monitor – SDI input with embedded audio, 1 reclocked SDI output, 1 composite analog output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs AES audio outputs	7760AVM
7760AVM-D	SDI Video and Audio Monitor – SDI input with embedded audio, 1 AES channel input, 1 reclocked SDI output, 1 SDI output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-E	SDI Video and Audio Monitor – SDI input with embedded audio, 2 reclocked SDI outputs, 2 composite analog and 2 SDI outputs with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-F	SDI Video and Audio Monitor – SDI input with embedded audio, 2 reclocked SDI outputs, 2 composite analog and 2 SDI outputs with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog and AES audio outputs	7760AVM
7760AVM-G	SDI Video and Audio Monitor – SDI input with embedded audio, 1 SDI output and 1 composite analog with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-LITE-A	SDI Video and Audio Monitoring DAC – AES outputs	7760AVM-LITE
7760AVM-LITE-B	SDI Video and Audio Monitoring DAC – AES inputs	7760AVM-LITE
7761AVM-DC	Dual Composite Analog Video and Audio Monitor	7761AVM
7765AVM-4A-AV	Quad SDI Video and Audio Monitor with 4 OSD outputs on NTSC/PAL Analog Video – Embedded or AES Audio	7765AVM-4
7765AVM-4A-HD	Quad SDI Video and Audio Monitor with 4 OSD outputs on HD (SMPTE 292M) – Embedded or AES Audio	7765AVM-4
7765AVM-4A-SD	Quad SDI Video and Audio Monitor with 4 OSD outputs on SD (SMPTE 259M) – Embedded or AES Audio	7765AVM-4
7765AVM-4-AV	Quad SDI Video and Audio Monitor with 4 OSD outputs on NTSC/PAL Analog Video – Embedded Audio	7765AVM-4
7765AVM-4A-VGA	Quad SDI Video and Audio Monitor with 4 OSD outputs on VGA display – Embedded or AES Audio	7765AVM-4
7765AVM-4-HD	Quad SDI Video and Audio Monitor with 4 OSD outputs on HD (SMPTE 292M) – Embedded Audio	7765AVM-4
7765AVM-4-SD	Quad SDI Video and Audio Monitor with 4 OSD outputs on SD (SMPTE 259M) – Embedded Audio	7765AVM-4
7765AVM-4-VGA	Quad SDI Video and Audio Monitor with 4 OSD outputs on VGA display – Embedded Audio	7765AVM-4

### 1.3. ANALOG TELEVISION PRODUCTS

Model	Description	Chapter
7700ADA	Analog equalizing DA, for HD component, and composite, AES	7700ADA
7750SSG	Slave Sync Generator – 2 NTSC Sync outputs and Colour Frame ID	7750SSG
7707CVR	Composite Analog Video + 4 Analog Audio Fiber Receiver with VistaLINK	7707CVR
7707CVT13	Composite Analog Video 4 Analog Audio Fiber Transmitter 1310 nm with VistaLINK	7707CVT
7707CVT15	Composite Analog Video 4 Analog Audio Fiber Transmitter 1550 nm with VistaLINK	7707CVT
7707CVTxx	Composite Analog Video 4 Analog Audio Fiber Transmitter CWDM with VistaLINK	7707CVT

## 2. MODULES BY FUNCTION

The modules listed in this section are organized by function then sub-sorted by model number.

### 2.1. DISTRIBUTION PRODUCTS

Model	Description	Chapter
7700ADA	Analog equalizing DA, for HD component, and composite, AES	7700ADA
7700DA	SDI 4 output DA, reclocks 19.4, 143, 177, 270, 360 & 540Mb/s	7700DA
7700DA10	SDI 10 output DA, reclocks 19.4, 143, 177, 270, 360 & 540Mb/s	7700DA10
7700DA-AESB	5 output balanced AES distribution amplifier (with terminal strip connectors)	7700DA-AES
7700DA-AESU	5 output unbalanced AES distribution amplifier (with BNC connectors)	7700DA-AES
7700DA-DS3	4 output DS3/E3/STS-1 reclocking DA	7700DA-DS3
7700DA-HD	1.5Gb/s 4 output HD DA (non reclocking for 19.4-540Mb/s)	7700DA-HD
7700DA8-HD	1.5Gb/s 8 output HD DA (non reclocking for 19.4-540Mb/s)	7700DA-HD
7740DLY	SDI Delay – 0 to .5 sec delay and selectable VBI blanking	7740
7740DLY-AES4	4 Channel AES Delay	7740DLY-AES4
7742DLY	SDI Delay – 0 to 2.33 sec delay and selectable VBI blanking	7740
7745FS	SDI Frame Synchronizer	7745FS
7745FS-AES	SDI Frame Synchronizer with 2 channels of AES	7745FS
7745FS-HD	HD Frame Synchronizer	7745FS-HD
7745FS-HD-AES	HD Frame Synchronizer with 2 channels of AES	7745FS-HD

## 2.2. FIBER OPTIC PRODUCTS

Model	Description	Chapter
7705AR	Fiber AES Audio Receiver (6 AES channels, LTC, RS232/422) – 1 slot 25 pin D	7705AR
7705AR-2	Fiber AES Audio Receiver (6 AES channels, LTC, RS232/422) – 2 slot 6 BNC, 25 pin D	7705AR
7705AT13	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) – 1 slot 25 pin D 1310 nm	7705AT
7705AT13-2	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 2 slot 6 BNC, 25 pin D 1310 nm	7705AT
7705AT15	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 1 slot 25 pin D 1550 nm	7705AT
7705AT15-2	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 2 slot 6 BNC, 25 pin D 1550 nm	7705AT
7705ATxx	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 1 slot 25 pin D CWDM	7705AT
7705ATxx-2	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 2 slot 6 BNC, 25 pin D CWDM	7705AT
7705CWDM-D4	Fiber Optic Coarse Wavelength Division Demultiplexor – four wavelengths	Passive Optical
7705CWDM-D8	Fiber Optic Coarse Wavelength Division Demultiplexor – eight wavelengths	Passive Optical
7705CWDM-M4	Fiber Optic Coarse Wavelength Division Multiplexor – four wavelengths	Passive Optical
7705CWDM-M8	Fiber Optic Coarse Wavelength Division Multiplexor – eight wavelengths	Passive Optical
7705DS	Fiber Optic Splitter/Combiner – Splits single wavelength signal to two signals of 50% power, Combines two wavelengths to one signal	Passive Optical
7705DS-8	Fiber Optic Splitter/Combiner – Splits single wavelength signal to eight signals of 12.5% power, Combines eight wavelengths to one signal	Passive Optical
7705DT13-F2	Fiber Data Transceiver - Dual Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm	7705DT
7705DT13-FC	Fiber Data Transceiver - Single Fiber, Rx & Tx on 1310 nm	7705DT
7705DT13-FW	Fiber Data Transceiver - Single Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm	7705DT
7705DT15-F2	Fiber Data Transceiver - Dual Fiber, Tx on 1550 nm, Rx on 1310 nm	7705DT
7705DT15-FC	Fiber Data Transceiver - Single Fiber, Rx & Tx on 1550 nm	7705DT
7705DT15-FW	Fiber Data Transceiver - Single Fiber, Tx on 1550 nm, Rx on 1310 nm	7705DT
7705DTxx-F2	Fiber Data Transceiver – Dual Fiber, Tx on CWDM wavelengths, Rx on 1310 nm to 1610 nm	7705DT
7705DTxx-FC	Fiber Data Transceiver – Single Fiber, Rx & Tx on CWDM wavelengths	7705DT
7705DTxx-FW	Fiber Data Transceiver – Single Fiber, Tx on CWDM wavelengths, Rx on 1310 nm	7705DT
7705EO13	Electrical to fiber Converter – 1310 nm – distances to 50 Km, TX rates up to 540Mbit/s	7705EO
7705EO15	Electrical to fiber Converter – 1550 nm – distances to 75 Km, TX rates up to 540Mbit/s	7705EO
7705Eoxx	Electrical to fiber Converter – CWDM – distances to 75 Km, TX rates up to 540Mbit/s	7705EO
7705EO13-HD	Electrical to fiber Converter – 1310 nm – distances to 6 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705EO13-HD-L	Electrical to fiber Converter – 1310 nm, – distances to 40 Km, TX rates up to 1.5 Gb/s	7705EO-HD



<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7705EO15-HD-L	Electrical to fiber Converter – 1550 nm, – distances to 50 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705Eoxx-HD	Electrical to fiber Converter – CWDM, , – distances to 50 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705ET13-F2	Fiber Dual Ethernet Transceiver – Dual Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm	7705DT
7705ET13-FC	Fiber Dual Ethernet Transceiver – Single Fiber, Rx & Tx on 1310 nm	7705DT
7705MS	Fiber Optic Monitoring Splitter – Splits single wavelength signal to two signals of 80%/20% power	Passive Optical
7705OE	Fiber to electrical Converter – 1310 to 1610 nm, TX rates up to 540Mbit/s	7705OE
7705OE-HD	Fiber to electrical Converter – 1310 to 1610 nm, TX rates up to 1.5 Gb/s	7705OE-HD
7705OE-HD-L	Fiber to electrical Converter – 1310 to 1610 nm, TX rates up to 1.5 Gb/s – high sensitivity	7705OE-HD
7705OO13	Fiber Optic Wavelength Converter – 1310 nm, TX rates up to 540Mbit/s	7705OO
7705OO15	Fiber Optic Wavelength Converter – 1550 nm, TX rates up to 540Mbit/s	7705OO
7705OOxx	Fiber Optic Wavelength Converter – CWDM, TX rates up to 540Mbit/s	7705OO
7705OO13-HD	Fiber Optic Wavelength Converter – 1310 nm, TX rates up to 1.5 Gb/s	7705OO-HD
7705OO13-HD-L	Fiber Optic Wavelength Converter – 1310 nm, TX rates up to 1.5 Gb/s – extra long haul	7705OO-HD
7705OO15-HD-L	Fiber Optic Wavelength Converter – 1550 nm, TX rates up to 1.5 Gb/s – extra long haul	7705OO-HD
7705OOxx-HD	Fiber Optic Wavelength Converter – CWDM, TX rates up to 1.5 Gb/s – extra long haul	7705OO-HD
7705WDM	Fiber Optic wavelength division multiplexor/demultiplexor – Allows use of single fiber for transmission of two signals at different wavelengths	Passive Optical
7707BPX	Optical Bypass Switch with VistaLINK	7707BPX
7707CVR	Composite Analog Video + 4 Analog Audio Fiber Receiver with VistaLINK	7707CVR
7707CVT13	Composite Analog Video 4 Analog Audio Fiber Transmitter 1310 nm with VistaLINK	7707CVT
7707CVT15	Composite Analog Video 4 Analog Audio Fiber Transmitter 1550 nm with VistaLINK	7707CVT
7707CVTxx	Composite Analog Video 4 Analog Audio Fiber Transmitter CWDM with VistaLINK	7707CVT
7707EO13	Electrical to fiber Converter - 1310 nm – distances to 50 Km, TX rates up to 540Mbit/s with VistaLINK	7707EO
7707EO15	Electrical to fiber Converter - 1550 nm – distances to 75 Km, TX rates up to 540Mbit/s with VistaLINK	7707EO
7707EOxx	Electrical to fiber Converter - CWDM – distances to 75 Km, TX rates up to 540Mbit/s with VistaLINK	7707EO
7707EO13-DS3	DS3 Electrical to fiber Converter with VistaLINK - 1310 nm – distances to 6 Km	7707EO-DS3
7707EO15-DS3	DS3 Electrical to fiber Converter with VistaLINK - 1550 nm, – distances to 50 Km	7707EO-DS3
7707EOxx-DS3	DS3 Electrical to fiber Converter with VistaLINK - CWDM, , – distances to 50 Km	7707EO-DS3

<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7707EO13-HD	Electrical to fiber Converter - 1310 nm – distances to 6 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707EO13-HD-L	Electrical to fiber Converter - 1310 nm, – distances to 40 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707EO15-HD-L	Electrical to fiber Converter - 1550 nm, – distances to 50 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707EOxx-HD	Electrical to fiber Converter - CWDM, , – distances to 50 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707ET13-4	Fiber Quad Ethernet Transceiver (-7.5 dBm) - Single Fiber, Rx & Tx on 1310 nm with VistaLINK	7707ET
7707ET13M-4	Fiber Quad Ethernet Transceiver (0 dBm) - Single Fiber, Rx & Tx on 1310 nm with VistaLINK	7707ET
7707ET15-4	Fiber Quad Ethernet Transceiver - Single Fiber, Rx & Tx on 1550 nm with VistaLINK	7707ET
7707ETxx-4	Fiber Quad Ethernet Transceiver - Single Fiber, Rx & Tx on CWDM wavelengths with VistaLINK	7707ET
7707ET13-F2	Fiber Dual Ethernet Transceiver (-7.5 dBm) - Dual Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm with VistaLINK	7707ET
7707ET13-FC	Fiber Dual Ethernet Transceiver (-7.5 dBm) - Single Fiber, Rx & Tx on 1310 nm with VistaLINK	7707ET
7707ET13M-F2	Fiber Dual Ethernet Transceiver (0 dBm)- Dual Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm with VistaLINK	7707ET
7707ET13M-FC	Fiber Dual Ethernet Transceiver (0 dBm) - Single Fiber, Rx & Tx on 1310 nm with VistaLINK	7707ET
7707ET15-F2	Fiber Dual Ethernet Transceiver - Dual Fiber, Tx on 1550 nm, Rx on 1310 nm with VistaLINK	7707ET
7707ET15-FC	Fiber Dual Ethernet Transceiver - Single Fiber, Rx & Tx on 1550 nm with VistaLINK	7707ET
7707ETxx-F2	Fiber Dual Ethernet Transceiver - Dual Fiber, Tx on CWDM wavelengths, Rx on 1310 nm to 1610 nm with VistaLINK	7707ET
7707ETxx-FC	Fiber Dual Ethernet Transceiver - Single Fiber, Rx & Tx on CWDM wavelengths with VistaLINK	7707ET
7707MR13	Multi-Signal Fiber Receiver (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1310 nm	7707MR
7707MR13-A4	Multi-Signal Fiber Receiver (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1310 nm	7707MR
7707MR15	Multi-Signal Fiber Receiver (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1550 nm	7707MR
7707MR15-A4	Multi-Signal Fiber Receiver (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1550 nm	7707MR
7707MRxx	Multi-Signal Fiber Receiver (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on CWDM wavelengths	7707MR
7707MRxx-A4	Multi-Signal Fiber Receiver (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on CWDM wavelengths	7707MR
7707MT13	Multi-Signal Fiber Transmitter (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1310 nm	7707MT
7707MT13-A4	Multi-Signal Fiber Transmitter (SDI Video +4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1310 nm	7707MT
7707MT15	Multi-Signal Fiber Transmitter (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1550 nm	7707MT
7707MT15-A4	Multi-Signal Fiber Transmitter (SDI Video +4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1550 nm	7707MT

<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7707MTxx	Multi-Signal Fiber Transmitter (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - CWDM	7707MT
7707MTxx-A4	Multi-Signal Fiber Transmitter (SDI Video +4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - CWDM	7707MT
7707OE	Fiber to electrical Converter - 1310 to 1610 nm, TX rates up to 540Mbit/s with VistaLINK	7707OE
7707OE-DS3	DS3 Fiber to electrical Converter - 1310 to 1610 nm, with VistaLINK	7707OE-DS3
7707OE-HD	Fiber to electrical Converter - 1310 to 1610 nm, TX rates up to 1.5 Gb/s with VistaLINK	7707OE-HD
7707VAR	SDI Video + 2 AES Audio Fiber Receiver with VistaLINK	7707VAR
7707VAR-4	Quad SDI Video + 8 AES Audio Fiber Receiver with VistaLINK	7707VAR
7707VAT13	SDI Video + 2 AES Audio Fiber Transmitter 1310 nm with VistaLINK	7707VAT
7707VAT15	SDI Video + 2 AES Audio Fiber Transmitter 1550 nm with VistaLINK	7707VAT
7707VATxx	SDI Video + 2 AES Audio Fiber Transmitter CWDM with VistaLINK	7707VAT
7707VAT13-4	Quad SDI Video + 8 AES Audio Fiber Transmitter 1310 nm with VistaLINK	7707VAT
7707VAT15-4	Quad SDI Video + 8 AES Audio Fiber Transmitter 1550 nm with VistaLINK	7707VAT
7707VATxx-4	Quad SDI Video + 8 AES Audio Fiber Transmitter CWDM with VistaLINK	7707VAT

### **2.3. HD DOWN CONVERSION PRODUCTS**

<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7710MD- HN	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 Analog output	7710MD
7710MD- HN-SF	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 Analog output - with 1080p/24sF support	7710MD
7710MD- HSN	HD monitoring down converter – 1.5 Gb/s input, 4 HD reclocked outputs, 2 SDI , 2 Analog outputs	7710MD
7710MD- HSN-SF	HD monitoring down converter – 1.5 Gb/s input, 4 HD reclocked outputs, 2 SDI , 2 Analog outputs - with 1080p/24sF support	7710MD
7710MD- S	HD monitoring down converter – 1.5 Gb/s input, 4 SDI outputs	7710MD
7710MD- SN	HD monitoring down converter – 1.5 Gb/s input, 2 SDI , 2 Analog outputs	7710MD
7710MD- SN-SF	HD monitoring down converter – 1.5 Gb/s input, 2 SDI , 2 Analog outputs - with 1080p/24sF support	7710MD
7710MD- S-SF	HD monitoring down converter – 1.5 Gb/s input, 4 SDI outputs - with 1080p/24sF support	7710MD
7710MD-HS	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 SDI outputs	7710MD
7710MD-HS-SF	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 SDI outputs - with 1080p/24sF support	7710MD

## 2.4. SOURCE ID / VIDEO AND AUDIO MONITORING PRODUCTS

Model	Description	Chapter
7760AVM-A	SDI Video and Audio Monitor – SDI input with embedded audio, 1 reclocked SDI output, 1 composite analog output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-B	SDI Video and Audio Monitor – SDI input with embedded audio, 1 reclocked SDI output, 1 SDI output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-C	SDI Video and Audio Monitor – SDI input with embedded audio, 1 reclocked SDI output, 1 composite analog output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs AES audio outputs	7760AVM
7760AVM-D	SDI Video and Audio Monitor – SDI input with embedded audio, 1 AES channel input, 1 reclocked SDI output, 1 SDI output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-E	SDI Video and Audio Monitor – SDI input with embedded audio, 2 reclocked SDI outputs, 2 composite analog and 2 SDI outputs with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-F	SDI Video and Audio Monitor – SDI input with embedded audio, 2 reclocked SDI outputs, 2 composite analog and 2 SDI outputs with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog and AES audio outputs	7760AVM
7760AVM-G	SDI Video and Audio Monitor – SDI input with embedded audio, 1 SDI output and 1 composite analog with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-LITE-A	SDI Video and Audio Monitoring DAC – AES outputs	7760AVM-LITE
7760AVM-LITE-B	SDI Video and Audio Monitoring DAC – AES inputs	7760AVM-LITE
7761AVM-DC	Dual Composite Analog Video and Audio Monitor	7761AVM
7765AVM-4A-AV	Quad SDI Video and Audio Monitor with 4 OSD outputs on NTSC/PAL Analog Video – Embedded or AES Audio	7765AVM-4
7765AVM-4A-HD	Quad SDI Video and Audio Monitor with 4 OSD outputs on HD (SMPTE 292M) – Embedded or AES Audio	7765AVM-4
7765AVM-4A-SD	Quad SDI Video and Audio Monitor with 4 OSD outputs on SD (SMPTE 259M) – Embedded or AES Audio	7765AVM-4
7765AVM-4-AV	Quad SDI Video and Audio Monitor with 4 OSD outputs on NTSC/PAL Analog Video – Embedded Audio	7765AVM-4
7765AVM-4A-VGA	Quad SDI Video and Audio Monitor with 4 OSD outputs on VGA display – Embedded or AES Audio	7765AVM-4
7765AVM-4-HD	Quad SDI Video and Audio Monitor with 4 OSD outputs on HD (SMPTE 292M) – Embedded Audio	7765AVM-4
7765AVM-4-SD	Quad SDI Video and Audio Monitor with 4 OSD outputs on SD (SMPTE 259M) – Embedded Audio	7765AVM-4
7765AVM-4-VGA	Quad SDI Video and Audio Monitor with 4 OSD outputs on VGA display – Embedded Audio	7765AVM-4



## 2.5. AUDIO / DATA EMBEDDER/DEEMBEDDER PRODUCTS

Model	Description	Chapter
7700DA-AESB	5 output balanced AES distribution amplifier (with terminal strip connectors)	7700DA-AES
7700DA-AESU	5 output unbalanced AES distribution amplifier (with BNC connectors)	7700DA-AES
7705AR	Fiber AES Audio Receiver (6 AES channels, LTC, RS232/422) – 1 slot 25 pin D	7705AR
7705AR-2	Fiber AES Audio Receiver (6 AES channels, LTC, RS232/422) – 2 slot 6 BNC, 25 pin D	7705AR
7705AT13	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) – 1 slot 25 pin D 1310 nm	7705AT
7705AT13-2	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) – 2 slot 6 BNC, 25 pin D 1310 nm	7705AT
7705AT15	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 1 slot 25 pin D 1550 nm	7705AT
7705AT15-2	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 2 slot 6 BNC, 25 pin D 1550 nm	7705AT
7705ATxx	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 1 slot 25 pin D CWDM	7705AT
7705ATxx-2	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 2 slot 6 BNC, 25 pin D CWDM	7705AT
7705DT13-F2	Fiber Data Transceiver - Dual Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm	7705DT
7705DT13-FC	Fiber Data Transceiver - Single Fiber, Rx & Tx on 1310 nm	7705DT
7705DT13-FW	Fiber Data Transceiver - Single Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm	7705DT
7705DT15-F2	Fiber Data Transceiver - Dual Fiber, Tx on 1550 nm, Rx on 1310 nm	7705DT
7705DT15-FC	Fiber Data Transceiver - Single Fiber, Rx & Tx on 1550 nm	7705DT
7705DT15-FW	Fiber Data Transceiver - Single Fiber, Tx on 1550 nm, Rx on 1310 nm	7705DT
7705DTxx-F2	Fiber Data Transceiver – Dual Fiber, Tx on CWDM wavelengths, Rx on 1310 nm to 1610 nm	7705DT
7705DTxx-FC	Fiber Data Transceiver – Single Fiber, Rx & Tx on CWDM wavelengths	7705DT
7705DTxx-FW	Fiber Data Transceiver – Single Fiber, Tx on CWDM wavelengths, Rx on 1310 nm	7705DT
7720AD	SDI AES Audio De-embedder - 2 Unbalanced AES Outputs	7720AD
7720AD-A4	SDI AES Audio De-embedder - 2 AES & 4 Analog Audio Outputs	7720AD
7720AD-OE	SDI AES Audio De-embedder with optical input - 2 AES Outputs	7720AD
7720AD4	SDI AES Audio De-embedder – 4 Unbalanced AES Outputs	7720AD
7720AD4-B	SDI AES Audio De-embedder – 4 Balanced AES Outputs	7720AD
7720AD-HD	HD AES Audio De-embedder – 2 AES Outputs	7720AD-HD
7720AD4-HD	HD AES Audio De-embedder – 4 AES Outputs	7720AD-HD
7720ADC-A4	2 AES Audio to 4 Analog Audio Converter	7720ADC-A4
7720AE	SDI AES audio embedder – 2 AES Inputs	7720AE
7720AE3	SDI AES audio embedder – 3 AES Inputs	7720AE
7720AE-EO	SDI AES audio embedder with Optical output 1310 nm – 2 AES Inputs	7720AE
7720AE-HD	HD AES Audio Embedder – 2 AES Inputs	7720AE-HD
7720AE3-HD	HD AES Audio Embedder – 3 AES Inputs	7720AE-HD
7720DAC-A4	4 Analog Audio to 2 AES Converter	7720DAC-A4
7721DD	SDI Data De-embedder	7721DD
7721DE	SDI Data Embedder	7721DE
7740DLY-AES4	4 Channel AES Delay	7740DLY-AES4

**2.6. CONVERSION PRODUCTS**

<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7735AVC-LB	SDI to NTSC/PAL Encoder with Line Buffer and Audio and Fault Monitoring with VistaLINK	7735AVC
7735CDM	NTSC/PAL to SDI Decoder with Frame Synchronizer and Analog OSD Monitoring with VistaLINK	7735CD
7735CDM-A4	NTSC/PAL to SDI Decoder with Frame Synchronizer, 4 channel audio A/D & multiplexor and Analog OSD Monitoring with VistaLINK	7735CD
7735CDM-AES	NTSC/PAL to SDI Decoder with Frame Synchronizer, 2 channel AES multiplexor and Analog OSD Monitoring with VistaLINK	7735CD
7735CDS	NTSC/PAL to SDI Decoder with Frame Synchronizer and SDI OSD Monitoring with VistaLINK	7735CD
7735CDS-A4	NTSC/PAL to SDI Decoder with Frame Synchronizer, 4 channel audio A/D & multiplexor and SDI OSD Monitoring with VistaLINK	7735CD
7735CDS-AES	NTSC/PAL to SDI Decoder with Frame Synchronizer, 2 channel AES multiplexor and SDI OSD Monitoring with VistaLINK	7735CD
7735CE	SDI to NTSC/PAL Encoder with Frame Synchronizer with VistaLINK	7735CE
7735CE-A4	SDI to NTSC/PAL Encoder with Frame Synchronizer and 4 ch audio demux & D/A with VistaLINK	7735CE
7735CEM	SDI to NTSC/PAL Encoder with Frame Synchronizer and Analog OSD Monitoring with VistaLINK	7735CE
7735CEM-A4	SDI to NTSC/PAL Encoder with Frame Synchronizer, 4 ch audio demux & D/A and Analog OSD Monitoring with VistaLINK	7735CE

**2.7. SYNC & TEST GENERATOR PRODUCTS**

<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7750SRG-HD	HD Slave Reference Generator – 4 Sync outputs	7750SRG-HD
7750SSG	SD Slave Sync Generator - Colour Frame ID and 2 Sync outputs with colour burst	7750SSG
7750SSG-4	SD Slave Sync Generator - 4 Sync outputs with colour burst	7750SSG
7750TG	SDI Test Generator with Embedded Audio - 4 outputs	7750TG
7750TG2-HD	HD 4:2:2 / 4:4:4 Test Generator with Embedded Audio	7750TG2-HD
7750TG-HD	HD Test Generator with Embedded Audio - 4 outputs	7750TG-HD
7750TG-TS	DVB-ASI/SMPTE 310M Test Generator	7750TG-TS

**2.8. CONTROL PRODUCTS**

<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7700FC	7700 VistaLINK Frame Controller – Ethernet VistaLINK control for the 7700FR-C frame	7700FC

### 3. MODULES BY MODEL NUMBER

The modules listed in this section are organized by model number

Model	Description	Chapter
7700ADA	Analog equalizing DA, for HD component, and composite, AES	7700ADA
7700DA	SDI 4 output DA, reclocks 19.4, 143, 177, 270, 360 & 540Mb/s	7700DA
7700DA10	SDI 10 output DA, reclocks 19.4, 143, 177, 270, 360 & 540Mb/s	7700DA10
7700DA-AESB	5 output balanced AES distribution amplifier (with terminal strip connectors)	7700DA-AES
7700DA-AESU	5 output unbalanced AES distribution amplifier (with BNC connectors)	7700DA-AES
7700DA-DS3	4 output DS3/E3/STS-1 reclocking DA	7700DA-DS3
7700DA-HD	1.5Gb/s 4 output HD DA (non reclocking for 19.4-540Mb/s)	7700DA-HD
7700DA8-HD	1.5Gb/s 8 output HD DA (non reclocking for 19.4-540Mb/s)	7700DA-HD
7700FC	7700 VistaLINK Frame Controller – Ethernet VistaLINK control for the 7700FR-C frame	7700FC
7700SID	Composite digital Source ID decoder	7700SID-AM
7700SID-AM	Composite digital Source ID decoder - Audio Monitor	7700SID-AM
7700SID-CM	Composite analog Source ID decoder	7700SID-CM
7705AR	Fiber AES Audio Receiver (6 AES channels, LTC, RS232/422) - 1 slot 25 pin D	7705AR
7705AR-2	Fiber AES Audio Receiver (6 AES channels, LTC, RS232/422) - 2 slot 6 BNC, 25 pin D	7705AR
7705AT13	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 1 slot 25 pin D 1310 nm	7705AT
7705AT13-2	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 2 slot 6 BNC, 25 pin D 1310 nm	7705AT
7705AT15	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 1 slot 25 pin D 1550 nm	7705AT
7705AT15-2	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 2 slot 6 BNC, 25 pin D 1550 nm	7705AT
7705ATxx	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 1 slot 25 pin D CWDM	7705AT
7705ATxx-2	Fiber AES Audio Transmitter (6 AES channels, LTC, RS232/422) - 2 slot 6 BNC, 25 pin D CWDM	7705AT
7705CWDM-D4	Fiber Optic Coarse Wavelength Division Demultiplexor – four wavelengths	Passive Optical
7705CWDM-D8	Fiber Optic Coarse Wavelength Division Demultiplexor – eight wavelengths	Passive Optical
7705CWDM-M4	Fiber Optic Coarse Wavelength Division Multiplexor – four wavelengths	Passive Optical
7705CWDM-M8	Fiber Optic Coarse Wavelength Division Multiplexor – eight wavelengths	Passive Optical
7705DS	Fiber Optic Splitter/Combiner – Splits single wavelength signal to two signals of 50% power, Combines two wavelengths to one signal	Passive Optical
7705DS-8	Fiber Optic Splitter/Combiner – Splits single wavelength signal to eight signals of 12.5% power, Combines eight wavelengths to one signal	Passive Optical
7705DT13-F2	Fiber Data Transceiver - Dual Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm	7705DT
7705DT13-FC	Fiber Data Transceiver - Single Fiber, Rx & Tx on 1310 nm	7705DT
7705DT13-FW	Fiber Data Transceiver - Single Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm	7705DT

Model	Description	Chapter
7705DT15-F2	Fiber Data Transceiver - Dual Fiber, Tx on 1550 nm, Rx on 1310 nm	7705DT
7705DT15-FC	Fiber Data Transceiver - Single Fiber, Rx & Tx on 1550 nm	7705DT
7705DT15-FW	Fiber Data Transceiver - Single Fiber, Tx on 1550 nm, Rx on 1310 nm	7705DT
7705DTxx-F2	Fiber Data Transceiver – Dual Fiber, Tx on CWDM wavelengths, Rx on 1310 nm to 1610 nm	7705DT
7705DTxx-FC	Fiber Data Transceiver – Single Fiber, Rx & Tx on CWDM wavelengths	7705DT
7705DTxx-FW	Fiber Data Transceiver – Single Fiber, Tx on CWDM wavelengths, Rx on 1310 nm	7705DT
7705EO13	Electrical to fiber Converter – 1310 nm – distances to 50 Km, TX rates up to 540Mbit/s	7705EO
7705EO15	Electrical to fiber Converter – 1550 nm – distances to 75 Km, TX rates up to 540Mbit/s	7705EO
7705Eoxx	Electrical to fiber Converter – CWDM – distances to 75 Km, TX rates up to 540Mbit/s	7705EO
7705EO13-HD	Electrical to fiber Converter – 1310 nm – distances to 6 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705EO13-HD-L	Electrical to fiber Converter – 1310 nm, – distances to 40 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705EO15-HD-L	Electrical to fiber Converter – 1550 nm, – distances to 50 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705Eoxx-HD	Electrical to fiber Converter – CWDM, , – distances to 50 Km, TX rates up to 1.5 Gb/s	7705EO-HD
7705ET13-F2	Fiber Dual Ethernet Transceiver – Dual Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm	7705DT
7705ET13-FC	Fiber Dual Ethernet Transceiver – Single Fiber, Rx & Tx on 1310 nm	7705DT
7705MS	Fiber Optic Monitoring Splitter – Splits single wavelength signal to two signals of 80%/20% power	Passive Optical
7705OE	Fiber to electrical Converter – 1310 to 1610 nm, TX rates up to 540Mbit/s	7705OE
7705OE-HD	Fiber to electrical Converter – 1310 to 1610 nm, TX rates up to 1.5 Gb/s	7705OE-HD
7705OE-HD-L	Fiber to electrical Converter – 1310 to 1610 nm, TX rates up to 1.5 Gb/s – high sensitivity	7705OE-HD
7705OO13	Fiber Optic Wavelength Converter – 1310 nm, TX rates up to 540Mbit/s	7705OO
7705OO15	Fiber Optic Wavelength Converter – 1550 nm, TX rates up to 540Mbit/s	7705OO
7705OOxx	Fiber Optic Wavelength Converter – CWDM, TX rates up to 540Mbit/s	7705OO
7705OO13-HD	Fiber Optic Wavelength Converter – 1310 nm, TX rates up to 1.5 Gb/s	7705OO-HD
7705OO13-HD-L	Fiber Optic Wavelength Converter – 1310 nm, TX rates up to 1.5 Gb/s – extra long haul	7705OO-HD
7705OO15-HD-L	Fiber Optic Wavelength Converter – 1550 nm, TX rates up to 1.5 Gb/s – extra long haul	7705OO-HD
7705OOxx-HD	Fiber Optic Wavelength Converter – CWDM, TX rates up to 1.5 Gb/s – extra long haul	7705OO-HD
7705WDM	Fiber Optic wavelength division multiplexor/demultiplexor – Allows use of single fiber for transmission of two signals at different wavelengths	Passive Optical
7707BPX	Optical Bypass Switch with VistaLINK	7707BPX
7707CVR	Composite Analog Video + 4 Analog Audio Fiber Receiver with VistaLINK	7707CVR



<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7707CVT13	Composite Analog Video 4 Analog Audio Fiber Transmitter 1310 nm with VistaLINK	7707CVT
7707CVT15	Composite Analog Video 4 Analog Audio Fiber Transmitter 1550 nm with VistaLINK	7707CVT
7707CVTxx	Composite Analog Video 4 Analog Audio Fiber Transmitter CWDM with VistaLINK	7707CVT
7707EO13	Electrical to fiber Converter - 1310 nm – distances to 50 Km, TX rates up to 540Mbit/s with VistaLINK	7707EO
7707EO15	Electrical to fiber Converter - 1550 nm – distances to 75 Km, TX rates up to 540Mbit/s with VistaLINK	7707EO
7707EOxx	Electrical to fiber Converter - CWDM – distances to 75 Km, TX rates up to 540Mbit/s with VistaLINK	7707EO
7707EO13-DS3	DS3 Electrical to fiber Converter with VistaLINK - 1310 nm – distances to 6 Km	7707EO-DS3
7707EO15-DS3	DS3 Electrical to fiber Converter with VistaLINK - 1550 nm, – distances to 50 Km	7707EO-DS3
7707EOxx-DS3	DS3 Electrical to fiber Converter with VistaLINK - CWDM, , – distances to 50 Km	7707EO-DS3
7707EO13-HD	Electrical to fiber Converter - 1310 nm – distances to 6 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707EO13-HD-L	Electrical to fiber Converter - 1310 nm, – distances to 40 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707EO15-HD-L	Electrical to fiber Converter - 1550 nm, – distances to 50 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707EOxx-HD	Electrical to fiber Converter - CWDM, , – distances to 50 Km, TX rates up to 1.5 Gb/s with VistaLINK	7707EO-HD
7707ET13-4	Fiber Quad Ethernet Transceiver (-7.5 dBm) - Single Fiber, Rx & Tx on 1310 nm with VistaLINK	7707ET
7707ET13M-4	Fiber Quad Ethernet Transceiver (0 dBm) - Single Fiber, Rx & Tx on 1310 nm with VistaLINK	7707ET
7707ET15-4	Fiber Quad Ethernet Transceiver - Single Fiber, Rx & Tx on 1550 nm with VistaLINK	7707ET
7707ETxx-4	Fiber Quad Ethernet Transceiver - Single Fiber, Rx & Tx on CWDM wavelengths with VistaLINK	7707ET
7707ET13-F2	Fiber Dual Ethernet Transceiver (-7.5 dBm) - Dual Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm with VistaLINK	7707ET
7707ET13-FC	Fiber Dual Ethernet Transceiver (-7.5 dBm) - Single Fiber, Rx & Tx on 1310 nm with VistaLINK	7707ET
7707ET13M-F2	Fiber Dual Ethernet Transceiver (0 dBm)- Dual Fiber, Tx on 1310 nm, Rx on 1470 to 1610 nm with VistaLINK	7707ET
7707ET13M-FC	Fiber Dual Ethernet Transceiver (0 dBm) - Single Fiber, Rx & Tx on 1310 nm with VistaLINK	7707ET
7707ET15-F2	Fiber Dual Ethernet Transceiver - Dual Fiber, Tx on 1550 nm, Rx on 1310 nm with VistaLINK	7707ET
7707ET15-FC	Fiber Dual Ethernet Transceiver - Single Fiber, Rx & Tx on 1550 nm with VistaLINK	7707ET
7707ETxx-F2	Fiber Dual Ethernet Transceiver - Dual Fiber, Tx on CWDM wavelengths, Rx on 1310 nm to 1610 nm with VistaLINK	7707ET
7707ETxx-FC	Fiber Dual Ethernet Transceiver - Single Fiber, Rx & Tx on CWDM wavelengths with VistaLINK	7707ET

<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7707MR13	Multi-Signal Fiber Receiver (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1310 nm	7707MR
7707MR13-A4	Multi-Signal Fiber Receiver (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1310 nm	7707MR
7707MR15	Multi-Signal Fiber Receiver (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1550 nm	7707MR
7707MR15-A4	Multi-Signal Fiber Receiver (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on 1550 nm	7707MR
7707MRxx	Multi-Signal Fiber Receiver (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on CWDM wavelengths	7707MR
7707MRxx-A4	Multi-Signal Fiber Receiver (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - Tx on CWDM wavelengths	7707MR
7707MT13	Multi-Signal Fiber Transmitter (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1310 nm	7707MT
7707MT13-A4	Multi-Signal Fiber Transmitter (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1310 nm	7707MT
7707MT15	Multi-Signal Fiber Transmitter (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1550 nm	7707MT
7707MT15-A4	Multi-Signal Fiber Transmitter (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - 1550 nm	7707MT
7707MTxx	Multi-Signal Fiber Transmitter (SDI Video + 2 AES + RS422 + 2 GPI + 2 GPO) with VistaLINK - CWDM	7707MT
7707MTxx-A4	Multi-Signal Fiber Transmitter (SDI Video + 4 Analog Audio + RS422 + 2 GPI + 2 GPO) with VistaLINK - CWDM	7707MT
7707OE	Fiber to electrical Converter - 1310 to 1610 nm, TX rates up to 540Mbit/s with VistaLINK	7707OE
7707OE-DS3	DS3 Fiber to electrical Converter - 1310 to 1610 nm, with VistaLINK	7707OE-DS3
7707OE-HD	Fiber to electrical Converter - 1310 to 1610 nm, TX rates up to 1.5 Gb/s with VistaLINK	7707OE-HD
7707VAR	SDI Video + 2 AES Audio Fiber Receiver with VistaLINK	7707VAR
7707VAR-4	Quad SDI Video + 8 AES Audio Fiber Receiver with VistaLINK	7707VAR
7707VAT13	SDI Video + 2 AES Audio Fiber Transmitter 1310 nm with VistaLINK	7707VAT
7707VAT15	SDI Video + 2 AES Audio Fiber Transmitter 1550 nm with VistaLINK	7707VAT
7707VATxx	SDI Video + 2 AES Audio Fiber Transmitter CWDM with VistaLINK	7707VAT
7707VAT13-4	Quad SDI Video + 8 AES Audio Fiber Transmitter 1310 nm with VistaLINK	7707VAT
7707VAT15-4	Quad SDI Video + 8 AES Audio Fiber Transmitter 1550 nm with VistaLINK	7707VAT
7707VATxx-4	Quad SDI Video + 8 AES Audio Fiber Transmitter CWDM with VistaLINK	7707VAT
7710MD- HN	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 Analog output	7710MD
7710MD- HN-SF	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 Analog output - with 1080p/24sF support	7710MD
7710MD- HSN	HD monitoring down converter – 1.5 Gb/s input, 4 HD reclocked outputs, 2 SDI , 2 Analog outputs	7710MD
7710MD- HSN-SF	HD monitoring down converter – 1.5 Gb/s input, 4 HD reclocked outputs, 2 SDI , 2 Analog outputs - with 1080p/24sF support	7710MD
7710MD- S	HD monitoring down converter – 1.5 Gb/s input, 4 SDI outputs	7710MD
7710MD- SN	HD monitoring down converter – 1.5 Gb/s input, 2 SDI , 2 Analog outputs	7710MD

<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7710MD-SN-SF	HD monitoring down converter – 1.5 Gb/s input, 2 SDI , 2 Analog outputs - with 1080p/24sF support	7710MD
7710MD-S-SF	HD monitoring down converter – 1.5 Gb/s input, 4 SDI outputs - with 1080p/24sF support	7710MD
7710MD-HS	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 SDI outputs	7710MD
7710MD-HS-SF	HD monitoring down converter - 1.5 Gb/s input, 2 HD reclocked outputs, 2 SDI outputs - with 1080p/24sF support	7710MD
7720AD	SDI AES Audio De-embedder - 2 Unbalanced AES Outputs	7720AD
7720AD-A4	SDI AES Audio De-embedder - 2 AES & 4 Analog Audio Outputs	7720AD
7720AD-OE	SDI AES Audio De-embedder with optical input - 2 AES Outputs	7720AD
7720AD4	SDI AES Audio De-embedder – 4 Unbalanced AES Outputs	7720AD
7720AD4-B	SDI AES Audio De-embedder – 4 Balanced AES Outputs	7720AD
7720AD-HD	HD AES Audio De-embedder – 2 AES Outputs	7720AD-HD
7720AD4-HD	HD AES Audio De-embedder – 4 AES Outputs	7720AD-HD
7720ADC-A4	2 AES Audio to 4 Analog Audio Converter	7720ADC-A4
7720AE	SDI AES audio embedder – 2 AES Inputs	7720AE
7720AE3	SDI AES audio embedder – 3 AES Inputs	7720AE
7720AE-EO	SDI AES audio embedder with Optical output 1310 nm – 2 AES Inputs	7720AE
7720AE-HD	HD AES Audio Embedder – 2 AES Inputs	7720AE-HD
7720AE3-HD	HD AES Audio Embedder – 3 AES Inputs	7720AE-HD
7720DAC-A4	4 Analog Audio to 2 AES Converter	7720DAC-A4
7721AES-D	AES to Data Converter	7721AES-D
7721D-AES	Data to AES Converter	7721D-AES
7721DD	SDI Data De-embedder	7721DD
7721DE	SDI Data Embedder	7721DE
7721GPI-D	GPI Receiver	7721D-AES
7725VBI-K	VBI Signal Inserter	7721D-AES
7730DAC	SD D to A Converter: YcrCb/RGB & Sync – BNC Outputs	7730DAC
7730DAC-HD	HD D to A Converter: YprPb/RGB & Sync – BNC Outputs	7730DAC-HD
7730DAC-HD-V	HD D to A Converter: VGA Output & GPI – DB15	7730DAC-HD
7732PFT-HD	HD Progressive Format Translator 1080p/24sF Input, 1080i/60 output	7732PFT-HD
7735AVC-LB	SDI to NTSC/PAL Encoder with Line Buffer and Audio and Fault Monitoring with VistaLINK	7735AVC
7735CDM	NTSC/PAL to SDI Decoder with Frame Synchronizer and Analog OSD Monitoring with VistaLINK	7735CD
7735CDM-A4	NTSC/PAL to SDI Decoder with Frame Synchronizer, 4 channel audio A/D & multiplexor and Analog OSD Monitoring with VistaLINK	7735CD
7735CDM-AES	NTSC/PAL to SDI Decoder with Frame Synchronizer, 2 channel AES multiplexor and Analog OSD Monitoring with VistaLINK	7735CD
7735CDS	NTSC/PAL to SDI Decoder with Frame Synchronizer and SDI OSD Monitoring with VistaLINK	7735CD
7735CDS-A4	NTSC/PAL to SDI Decoder with Frame Synchronizer, 4 channel audio A/D & multiplexor and SDI OSD Monitoring with VistaLINK	7735CD
7735CDS-AES	NTSC/PAL to SDI Decoder with Frame Synchronizer, 2 channel AES multiplexor and SDI OSD Monitoring with VistaLINK	7735CD
7735CE	SDI to NTSC/PAL Encoder with Frame Synchronizer with VistaLINK	7735CE
7735CE-A4	SDI to NTSC/PAL Encoder with Frame Synchronizer and 4 ch audio demux & D/A with VistaLINK	7735CE
7735CEM	SDI to NTSC/PAL Encoder with Frame Synchronizer and Analog OSD Monitoring with VistaLINK	7735CE

<b>Model</b>	<b>Description</b>	<b>Chapter</b>
7735CEM-A4	SDI to NTSC/PAL Encoder with Frame Synchronizer, 4 ch audio demux & D/A and Analog OSD Monitoring with VistaLINK	7735CE
7740DLY	SDI Delay – 0 to .5 sec delay and selectable VBI blanking	7740
7740DLY-AES4	4 Channel AES Delay	7740DLY-AES4
7742DLY	SDI Delay – 0 to 2.33 sec delay and selectable VBI blanking	7740
7745FS	SDI Frame Synchronizer	7745FS
7745FS-AES	SDI Frame Synchronizer with 2 channels of AES	7745FS
7745FS-HD	HD Frame Synchronizer	7745FS-HD
7745FS-HD-AES	HD Frame Synchronizer with 2 channels of AES	7745FS-HD
7750SRG-HD	HD Slave Reference Generator – 4 Sync outputs	7750SRG-HD
7750SSG	SD Slave Sync Generator - Colour Frame ID and 2 Sync outputs with colour burst	7750SSG
7750SSG-4	SD Slave Sync Generator - 4 Sync outputs with colour burst	7750SSG
7750TG	SDI Test Generator with Embedded Audio - 4 outputs	7750TG
7750TG2-HD	HD 4:2:2 / 4:4:4 Test Generator with Embedded Audio	7750TG2-HD
7750TG-HD	HD Test Generator with Embedded Audio - 4 outputs	7750TG-HD
7750TG-TS	DVB-ASI/SMPTE 310M Test Generator	7750TG-TS
7760AVM-A	SDI Video and Audio Monitor – SDI input with embedded audio, 1 reclocked SDI output, 1 composite analog output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-B	SDI Video and Audio Monitor – SDI input with embedded audio, 1 reclocked SDI output, 1 SDI output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-C	SDI Video and Audio Monitor – SDI input with embedded audio, 1 reclocked SDI output, 1 composite analog output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs AES audio outputs	7760AVM
7760AVM-D	SDI Video and Audio Monitor – SDI input with embedded audio, 1 AES channel input, 1 reclocked SDI output, 1 SDI output with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-E	SDI Video and Audio Monitor – SDI input with embedded audio, 2 reclocked SDI outputs, 2 composite analog and 2 SDI outputs with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-F	SDI Video and Audio Monitor – SDI input with embedded audio, 2 reclocked SDI outputs, 2 composite analog and 2 SDI outputs with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog and AES audio outputs	7760AVM
7760AVM-G	SDI Video and Audio Monitor – SDI input with embedded audio, 1 SDI output and 1 composite analog with Audio level bargraphs and Source ID / VTR status keyed over video, 2 stereo pairs analog audio outputs	7760AVM
7760AVM-LITE-A	SDI Video and Audio Monitoring DAC - AES outputs	7760AVM-LITE
7760AVM-LITE-B	SDI Video and Audio Monitoring DAC - AES inputs	7760AVM-LITE
7761AVM-DC	Dual Composite Analog Video and Audio Monitor	7761AVM
7765AVM-4A-AV	Quad SDI Video and Audio Monitor with 4 OSD outputs on NTSC/PAL Analog Video - Embedded or AES Audio	7765AVM-4
7765AVM-4A-HD	Quad SDI Video and Audio Monitor with 4 OSD outputs on HD (SMPTE 292M) - Embedded or AES Audio	7765AVM-4

Model	Description	Chapter
7765AVM-4A-SD	Quad SDI Video and Audio Monitor with 4 OSD outputs on SD (SMPTE 259M) - Embedded or AES Audio	7765AVM-4
7765AVM-4-AV	Quad SDI Video and Audio Monitor with 4 OSD outputs on NTSC/PAL Analog Video - Embedded Audio	7765AVM-4
7765AVM-4A-VGA	Quad SDI Video and Audio Monitor with 4 OSD outputs on VGA display - Embedded or AES Audio	7765AVM-4
7765AVM-4-HD	Quad SDI Video and Audio Monitor with 4 OSD outputs on HD (SMPTE 292M) - Embedded Audio	7765AVM-4
7765AVM-4-SD	Quad SDI Video and Audio Monitor with 4 OSD outputs on SD (SMPTE 259M) - Embedded Audio	7765AVM-4
7765AVM-4-VGA	Quad SDI Video and Audio Monitor with 4 OSD outputs on VGA display - Embedded Audio	7765AVM-4



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**REVISION HISTORY**

<b><u>REVISION</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>DATE</u></b>
1.0	Original Version	June 99
1.1	Updated specifications	Sep 00
1.2	Updated power dissipation specification	May 02

## 1. OVERVIEW

The 7700FR is a 3 rack unit high rack frame for the 7700 series modular system. This advanced rack frame design can house up to 15 modules of any combination of the 7700 series distribution, conversion, processing and synchronization modules. Special care was taken during the design process to ensure that the 7700FR meets the demanding needs of television studios today has sufficient flexibility to satisfy the emerging demands of the future.

The 7700FR is designed with a high density capacity to conserve on precious equipment rack space. Care has been taken to ensure sufficient thermal relief for up to 160 watts of processing power per frame, to meet the increasing power demands of future high speed processing cards.

Hot swappable redundant switching power supplies and cooling fans allow power supply or fan replacement without compromising the integrity of critical signal paths.

The front loading design permits extraction of the power supplies and active modules from the front without compromising performance even at 1.5Gb/s. Thus, there is no need for time consuming re-cabling nor is there need to have access to the rear of the frame replace or exchange modules.

### Features:

- Houses up to 15 processing modules
- Each slot has individually configurable inputs and outputs
- Front monitoring window for verifying module and power supply status
- Frame status contact closure alarm signals power supply or fan failures and user selectable module alarms
- Front extractable modules, power supplies and fans
- Auto-ranging power supply operates from 90-250vac at 60/50hz
- Power supply and frame cooling fans are fully redundant and hot-swappable
- High-speed bussing and control system provided for modular applications

## 1.1. SPECIFICATIONS

### 1.1.1. Electrical

AC Mains Input	Auto ranging, 100 ⇔ 240 VAC, 50/60 Hz
Fuses:	4 amp, 250 Volt time delay 5 x 20 mm. – 2 per power supply
Maximum Power Dissipation:	200 W
Power Supply Configuration	Dual, redundant, separate AC inlets
Certification: Safety:	ETL Listed, Complies with CE Safety Directive
EMC:	Complies with FCC part 15, class A. Complies with EU EMC directive
Status Indicators (each power supply):	PSU status LED Local Error/Failure LED
Tally Output Connector:	4 pin terminal, relay N/O, N/C for status/fault alarm
Temperature:	0 - 40 °C optimal performance 0 - 50 °C operating

## 7700 MultiFrame Manual

### 7700FR 3 Rack Unit Frame

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#### 1.1.2. Physical

Height:	5.25" (133 mm)
Width:	19" (483 mm)
Depth:	14.5" (368 mm)
Module Capacity:	15 slots
Weight:	Approx 17.4 lbs (7.9 Kg) with 2 power supplies, no slots occupied Approx. 32 lbs. (14.5 Kg) with 2 power supplies all slots occupied

#### 1.2. COOLING

The 7700FR frame is designed to ensure adequate cooling for up to 160 watts of processing power per frame. Fans at the front and rear of each power supply module accomplish forced air cooling. Adjacent equipment may be mounted immediately to the top and bottom of the 7700FR frame. Additional module cooling is provided by interior cooling channels to ensure that even fully loaded frames mounted adjacent to each other will operate within the normal temperature range.



**For proper cooling, the frame must contain either two 7700PS power supplies, or one 7700PS power supply and one 7700PS-FM power supply blank panel with cooling fan.**

##### 1.2.1. Fan Exhaust

The cooling fans for the power supplies, located at the front of the frame, draw air in the front and exhaust out the sides of the frame. The cooling fans for the modules, located at the rear of the frame, draw air in the front and the exhaust out the rear of the frame. To ensure adequate cooling, care should be taken to ensure that the fan inlets and exhaust openings are free of obstructions.

#### 1.3. MOUNTING

The 7700FR Rack frame requires 3 rack units i.e. 5.25 inches (133 mm) of standard 19 inch (483 mm) wide rack space. To securely fasten the frame to the equipment rack, make sure that all four mounting screws are tightened securely.

#### 1.4. POWER

The 7700FR frame comes standard with one auto-ranging power supply that automatically senses the input voltage. An additional power supply (7700PS) can be ordered to provide fully redundant powering of the frame. When only one power supply is fitted, the frame will be fitted with a 7700PS-FM fan module to ensure the thermal integrity of the frame cooling. Power should be applied by connecting a 3-wire grounding type power supply cord to the power entry module on the rear panel of each power supply. The power cord should be minimum 18 AWG wire size; type SST marked VW-1, maximum 2.5 m in length.

The power entry modules contain a standard IEC power inlet connector, two 5 x 20 mm fuse holders and an EMI line filter.

#### **1.4.1. Changing the Fuses**

The fuse holder is located inside the power entry module. To change the fuses, pull out the fuse holder from the power entry module using a small screwdriver. The fuse holder contains two fuses, one for the line and one for the neutral side of the mains connection. Pull out the blown fuse and place a fuse of the correct value in its place. Use slo blo (time delay) 5 x 20 mm fuses rated for 250 Volts with a current rating of 4 amp. For your convenience there are spare fuses located in the vinyl pouch in the front of this manual. Carefully reinsert the fuseholder into the power entry module.



**Check that the line fuse is rated for the correct value marked on the rear panel. Never replace with a fuse of greater value.**

#### **1.4.2. Turning the Power On and Off**

Each 7700PS power supply is fitted with its own power switch. When the switch is turned off, the remaining power supply will power the 7700FR frame. To completely remove power from the frame, both power supplies must be turned off.

#### **1.4.3. Power Supply Indicator**

Each power supply has two indicators. The LED on the left indicates the health of the entire frame. The LED on the right indicates the health of the local power supply.

For example, if one of the power supplies malfunctions, then its local power supply LED will go off, and the frame status LED on both power supplies will turn off. The local power supply status LED on the power supply that is still functioning will remain on.

If there is a fuse failure return the power supply immediately. The power supplies are short circuit protected and should not blow the fuse under a short circuit condition.

#### **1.4.4. Replacing the Power Supply**

Each power supply is a complete assembly and includes the power supply cooling fan and one frame cooling fan. In the event that the power supply or one of the fans malfunctions, you will need to replace the power supply assembly with a spare one while the failed assembly is being repaired.



**Do not run the frame for extended periods of time with one of the power supplies removed. Proper cooling of the frame requires both power supplies to be inserted into the frame, or one power supply and a 7700PS-FM power supply blank panel.**



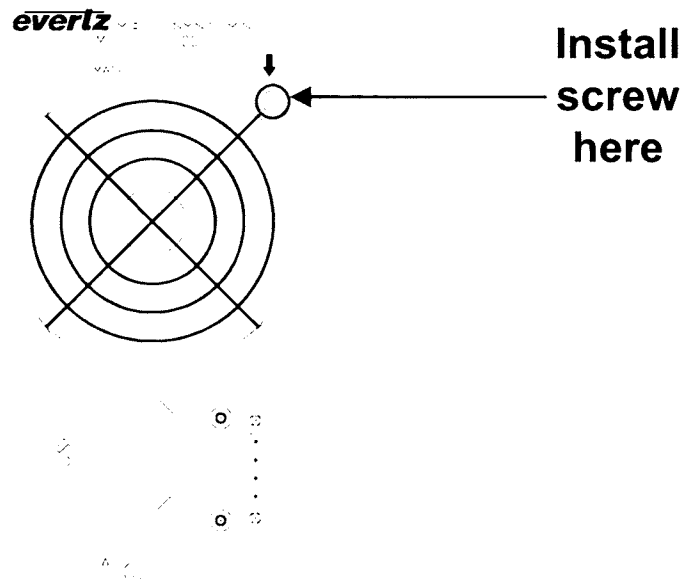
## 7700 MultiFrame Manual

### 7700FR 3 Rack Unit Frame

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The 7700FR power supplies are hot swappable and can be easily replaced from the front without interrupting the signal integrity of the frame. Each power supply is capable of supplying full power to the frame by itself, however we recommend running with both supplies powered for power redundancy. On frames with only one power supply, a 7700PS-FM blank power supply module with cooling fan **must be** inserted into the second power supply space. The 7700PS-FM contains a module cooling fan and baffles to maintain proper airflow within the frame.

The power supply is secured into the frame by a machine screw through the rear panel (as shown in Figure 1). This screw must be removed before the power supply can be extracted from the front. It is recommended that you replace the mounting screw after replacing the power supply.



**Figure 1: Locating the Power Supply Mounting Screw**

To replace the power supply the following procedure should be used.

1. Turn off the power supply switch
2. From the rear of the frame locate the power supply mounting screw. This screw is the top right screw holding the fan guard in place, and is indicated by the legend

PSU  
MNT ↓

3. Remove the power supply mounting screw.
4. Open the front door of the frame and pull the power supply out of the frame.
5. Reinsert the new power supply into the frame taking care that it is properly aligned with the card guides. Press firmly to make sure that the power supply is fully seated into the rear panel connector.
6. Reinstall the power supply mounting screw from the rear of the frame.
7. Turn on the power switch for the power supply. After a few seconds you should see the PSU STATUS LED come on indicating that the power supply is working correctly.

## 2. STATUS INDICATOR TERMINAL BLOCK

There is a terminal block at the rear of the frame that can be wired for frame status/fault indication. There are 4 connections:

Label	Pin #	Function
G	1	Chassis Ground
R	2	Common (connect to Ground or your reference)
O	3	Open with respect to common on a fault
C	4	Closed with respect to common on a fault

**Table 1: Status Tally Terminal Block Pin Assignments**

## 3. INSTALLING AND REMOVING THE MODULES

### 3.1. INSTALLING THE MODULE REAR PLATES

Each module is shipped with a matching rear panel plate which houses the connectors appropriate for the module. When installing a rear plate, locate the desired slot position where you wish to install the rear plate. Make a note of the slot number where you are installing the rear plate. Orient the plate so that the labeling is visible when the plate is installed. Loosely fasten the plate to the extrusions using the mounting screws provided, beginning with the top screw. You will tighten the screws after the main module is installed.

### 3.2. OPENING AND CLOSING THE FRONT PANEL

In order to insert or remove modules you will have to open the front panel. Turn the two captive screws located on the front panel counter clockwise several turns until they release completely from the front extrusions. Carefully lower the front panel door so that the front edge of the door is lower than the rear of the door.

### 3.3. INSTALLING THE MODULES

Orient the module vertically such that the white card ejector is on the bottom. Align the card with the card guide corresponding to the slot number where you installed the rear panel plate. Carefully slide the module into the frame and press it completely into the rear panel connectors. Make sure that the connectors are fully seated in the rear panel. When this is done, close the front panel and then tighten the screws that hold the rear panel in place.

### 3.4. REMOVING THE MODULES

Press the card ejector down to release the module. Grasp then the card using the card ejector and pull the module out from the frame. As the card ejector goes past the front extrusion, you will have to pull it with slightly more force. Carefully place the module in a safe place, free from static discharge.

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## **REVISION HISTORY**

<b><u>REVISION</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>DATE</u></b>
1.0	Original Version	June 99
1.1	Sections on design parameters, and design examples added	Aug 99
1.2	Changed Insertion Loss parameter on 7705MS to 9 dB	Jan 00
1.3	Changed Input power, and sensitivity values in Table 2 Changed part number of 7705EO15-HD-I to conform to new naming convention	July 00
1.4	Updated Input power, and sensitivity values in Table 2 Added CWDM and DS-4 and DS-8 passive devices to Table 3 Added OO devices to Table1 and 2	Feb 01

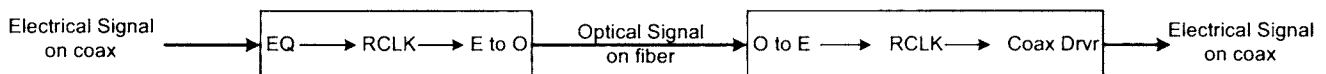
## 1. FIBER OPTICS FUNDAMENTALS

Fiber optics is best known for its applications in the telephone industry, even though it is widely used in video and television systems. In television systems they typically send signals between two locations or distribute the same signal to many destinations.

Traditional video distribution systems have used coaxial copper cabling. Fiber optic cable provides many advantages over traditional copper wire:

- Lower cable losses allow longer distances without distribution amplifiers
- Ability to carry higher data rate signals
- Improved signal quality
- Immunity from electro-magnetic radiation and Lightning
- Light Weight

The crucial difference between fiber optic distribution systems and coaxial cable systems is that signals are transmitted as light. The two key elements of optical fiber are its core and its cladding. The core is the inner part of the fiber, through which the light is guided. The cladding surrounds the core completely. The refractive property of the cladding is higher than that of the core, so light in the core that strikes the boundary with the cladding at a glancing angle, is totally reflected back into the core. The boundary of the core and cladding acts like a "cylindrical mirror", causing the core to act as a light pipe.



**Figure 1: Components of a Fiber Optic Transmission System**

The role of an optical transmitter is to convert an electrical data signal into an equivalent optical power waveform and couple it into an optical fiber. The role of the optical fiber is to convey the light from the source to the destination with the minimal amount of signal loss. The role of the optical receiver is to convert the optical power waveform back into an equivalent electrical data signal.

### 1.1. SYSTEM DESIGN PARAMETERS

#### 1.1.1. Electrical to Optical Parameters

In optical output devices, the main design parameters that are important are the launched output power, the wavelength and the linewidth. Launch power and wavelength are always important in system designs. Line width is usually important only in high definition applications.

##### 1.1.1.1. Transmitter Output Launch Power

The launched output power tells up the maximum power available at the optical transmitter. The following table indicates the launched output power available on current Evertz EO modules.



## 7700 MultiFrame Manual

### Fiber Optics System Design

Module	Minimum Launch Power	Wavelength	Spectral width of Optical Signal
7705EO13	-7.5 dBm	1310 nm	5 nm
7705EO13-HD	-7.5 dBm	1310 nm	5 nm
7705EO13-HD-L	0 dBm	1310 nm	0.8 nm
7705EO15	0 dBm	1550 nm	0.8 nm
7705EO15-HD-L	0 dBm	1550 nm	0.8 nm
7705EOxx	0 dBm	1470 to 1610 nm *	0.8 nm
7705EOxx-HD-L	0 dBm	1470 to 1610 nm *	0.8 nm

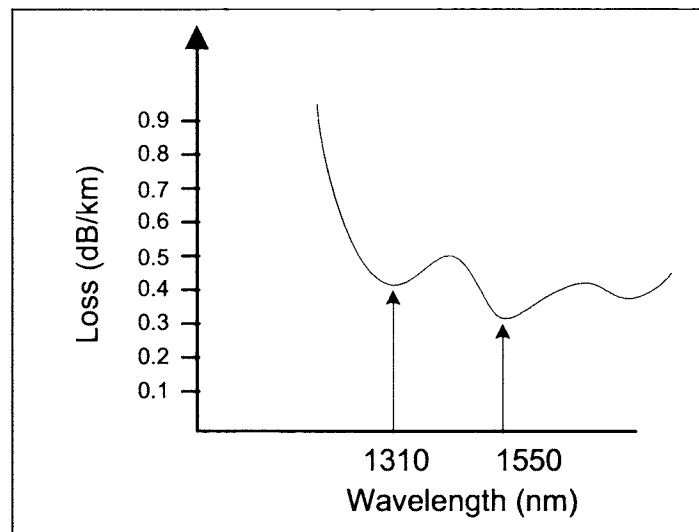
\* xx= 47 (1470 nm), 49 (1490 nm), 51 (1510 nm), 53 (1530 nm), 55 (1550 nm), 57 (1570 nm), 59 (1590 nm), 61 (1610 nm)

**Table 1: Launch Power**

#### 1.1.1.2. Wavelength

The wavelength of the optical signal determines the cable loss window within which the system will operate.

The Loss versus wavelength graph in Figure 2 shows that at 1310nm the cable loss is 0.40dB/km and at 1550nm the loss is 0.30dB/km.



**Figure 2: Cables Losses at Various Wavelengths**

#### 1.1.1.3. Linewidth

The linewidth is a measure of the laser's spectral purity, and determines the jitter penalty (how much jitter gets added to the signal). Linewidth is important in HD applications because the additional jitter penalty is significant compared to the bit period. In standard definition video applications linewidth is usually not a problem because the signal will lose too much power before it can go far enough for jitter to be a problem.

At 1310nm the jitter penalty is approximately 2.5psec/km of fiber /nm of linewidth. At 1550nm the jitter penalty is approximately 17ps/km of fiber/nm of linewidth.

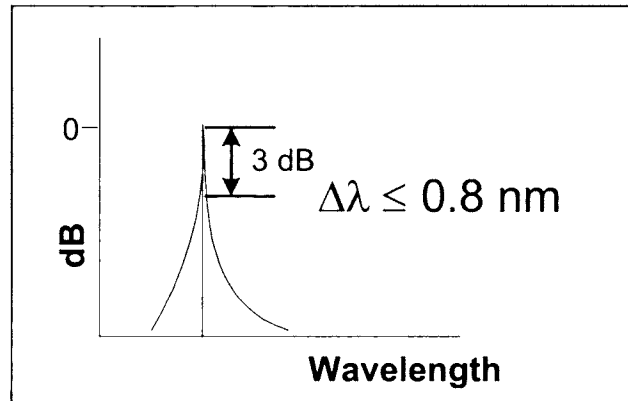


Figure 3: Spectrum of DFB Laser used in EO13-HD-L, EO15-HD-L and EOxx-HD

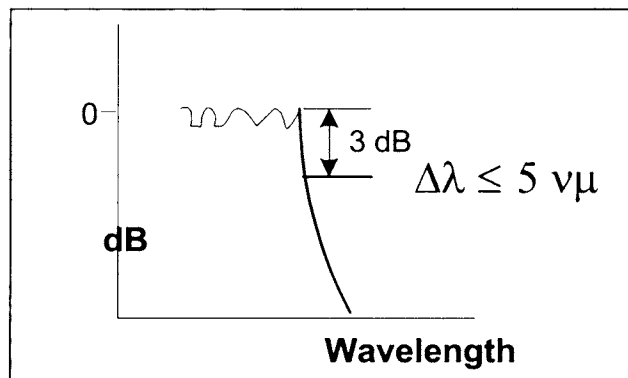


Figure 4: Spectrum of FP Laser used in EO13 and EO13-HD

### 1.1.2. Optical to Electrical Parameters

In Optical input devices, the main design parameters that are important are the maximum power before overload and the minimum power before errors (Sensitivity). The following table indicates the maximum power and sensitivity on current Evertz OE modules.

Module	Maximum Input Power	Sensitivity
7705OE	0 dBm	-30 dBm
7705OE-HD	-3 dBm	-17 dBm
7705OE-HD-L	-3 dBm	-20 dBm
7705OO	0 dBm	-30 dBm
7705OO-HD	0 dBm	-17 dBm

Table 2: Optical Receiver Power Parameters

### 1.1.3. Passive Optical Module Parameters

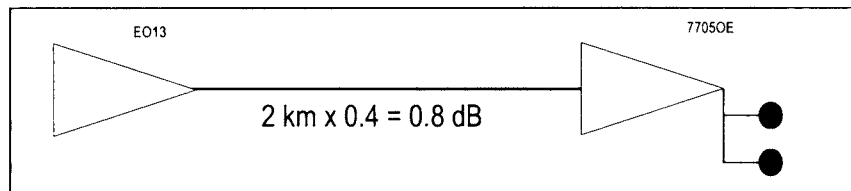
In passive optical modules, the main design parameter that is important is the loss through the passive device. The following table indicates the power loss on current Evertz passive fiber modules.

Module	Port	Insertion Loss
7705WDM		2 dB
7705CWDM-M4		< 3 dB
7705CWDM-D4		< 3 dB
7705CWDM-M8		< 6 dB
7705CWDM-M8		< 6 dB
7705DS		4 dB
7705DS-4		< 11 dB
7705DS-8		< 11 dB
7705MS	80 %	2 dB
	20 %	9 dB

**Table 3: Passive Module Insertion Loss**

## 1.2. DESIGN EXAMPLES

### 1.2.1. Standard Definition 2 km Link



Using the 7705EO13 as the transmitter.

Launch Power =	-7.5 dBm
Connector Loss = 2 x 1	-2.0 dB
Fiber Loss = 2 x 0.4	-0.8 dB
Safety Margin =	-2.0 dB
Power at receiver	-12.3 dBm

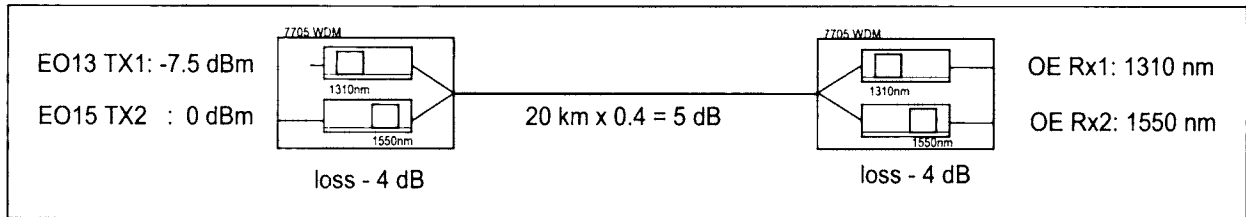
The 7705OE has a listed sensitivity of -30 dBm which is lower than -12.3 dBm so we can implement the system with no problems, at least with respect to power availability.

Next we need to check the jitter penalty. The system jitter penalty =  $2.5 \text{ ps/} \times 2 \text{ km} \times 5 \text{ nm} = 25 \text{ ps}$ . So by going through 2km of fiber, we add 25ps of jitter under the worst conditions (under the best conditions we would add 2ps total). The standard definition video bit period is 3.7 ns; so if the maximum jitter penalty is 20% or 740 ps., then the added jitter for this system is insignificant.

When would jitter-penalty be a problem? For 1310 nm wavelengths, the cable length where the jitter penalty becomes significant is calculated as:  $740 \text{ ps} \text{ divided by } 2.5 \text{ ps/km/nm divided by } 5 \text{ nm} = 60 \text{ Km}$  (worst case), or 600 Km (normal condition) At 60 Km cable length the cable loss is  $60 \times 0.4 = 24 \text{ dB}$ . So the power into the receiver would be:  $-6 \text{ dBm} - 24 \text{ dB} = -30 \text{ dBm}$ . This is equal to the published

specification of -30 dBm but leaves no margin for connector or other losses. The jitter penalty at 1550 nm for standard definition video is calculated as: 740 divided by 17 divided by 0.8 = 54 Km (worst case). At 54 Km cable length the cable loss is  $54 \times 0.3 = 16.2$  dB. So the power into the receiver would be:  $-0 \text{ dBm} - 16.2 \text{ dB} = -16.2 \text{ dBm}$ . This is above the published specification of -30 dBm, so added jitter may become significant on cable lengths approaching 54 Km at 1550 nm.

### 1.2.2. 20 Km Link With 2 Standard Definition Signals On 1 Fiber



For Tx1 < Rx1:

Launch Power =	-7.5 dBm
Connector Loss = $4 \times 1$	-4.0 dB
Fiber Loss = $20 \times 0.4$	-8.0 dB
Safety Margin =	-2.0 dB
WDM Loss = $2 \times 4$	-8.0 dB
Power at receiver	-29.5 dBm

For the 1310 nm path the power available at the receiver is very close to the receiver input sensitivity of -30 dBm. This calculation assumes the worst case connector losses, and a safety margin of 2 dB. In practice, the actual system may be viable, but we should assemble the system including the connectors and actually measure the available power at the receiver to determine the viability for sure. For the 1550 nm path the transmitter launch power is greater and the cable loss is less, so the resulting system design is OK for power loss.

## 2. CALCULATING THE OPTICAL SYSTEM POWER BUDGET

Given a specific optical transmitter and receiver pair, the most important question concerning a system designer or integrator is the maximum possible link length. Here is a worksheet that simplifies this calculation. The specific receiver/transmitter parameters used in the worksheet vary depending on the specific module being used. Consult the specifications in the respective chapters for the modules to get the correct values for the worksheet.

Transmitter Launch Power..... dBm

Receiver Sensitivity..... - dBm

**Maximum Allowable Loss:** ..... = dB

Fiber Loss: † \_\_\_\_ km X Attenuation: \_\_\_\_ dB/km..... dB

Connector Loss: ‡ \_\_\_\_ Connectors X Loss/Connector \_\_\_\_ dB ..... + dB

Passive Device Attenuation .....	+	_____	dB
Safety Margin.....	+	_____	dB
<b>Total System Loss:</b> .....	=	_____	dB

If the Total System Loss < Maximum Allowable loss, then the system is viable. A conservative industry standard for the safety margin is 2dB, and 1 dB per connector. However, these may vary and are usually determined by the system integrator/system engineer.

† Attenuation over Corning SMF 28 Single Mode Fiber: 0.3 dB/km @ 1550 nm, 0.4 dB/km @ 1310 nm

‡ If 62.5µm multimode fiber is used then 2dB must be added to the connector loss to account for receiver and cable fiber diameter mismatch.

3. CARE AND HANDLING OF OPTICAL FIBER

3.1. SAFETY

**Never look directly into an optical fiber.** Non-reversible damage to the eye can occur in a matter of milliseconds. The laser modules used in Evertz fiber optic products are all CLASS I, with a maximum output power of 2mW, and wavelengths of either 1310 nm or 14750 nm to 1610 nm.

3.2. HANDLING AND CONNECTING FIBERS



**Never touch the end face of an optical fiber.**

The transmission characteristics of the fiber are dependent on the shape of the optical core and therefore care must be taken to prevent fiber damage due to heavy objects or abrupt fiber bending. Evertz recommends that you maintain a minimum bending radius of 3 cm to avoid fiber bending loss that will decrease the maximum attainable distance of the fiber cable. Evertz fiber modules come with cable lockout devices, to prevent the user from damaging the fi ber by installing a module into a slot in the frame that does not have a suitable I/O module.

Dust particles on the ends of the optical fiber greatly increase the signal loss at interconnections, and large dust particles can even obscure light transmission altogether. To minimize the effects of dust contamination at the interconnections, the fiber should be cleaned each time it is mated or unmated. When using interconnection housings to mate two optical fibers it is good practice to remove dust particles from the housing assembly with a blast of dry air. Whenever a fiber is unmated it must be covered immediately. Most fiber manufacturers provide a plastic boot that fits over the ferrule body for this purpose.

Fiber interconnections must be made securely. The Evertz fiber optical transmitters and receivers come with SC interconnection housings built into the module. With this style of connector, the fiber assembly and the housing assembly can only be connected in one way and with very good repeatability. The rear fiber interconnect panel that is provided with each module can be ordered with optional Sc/PC, ST/PC or FC/PC connectors. The customer is required to provide the optical fiber with the correct connectors to

connect the modules together. SC/PC, ST/PC and FC/PC interconnection housing and connectors as well as adapters are industry standards with many available sources.

### **3.3. MAKING SURE THE OPTICAL FIBERS ARE CLEAN**

It is very important to ensure that optical fibers are clean before mating and after unmating. You should have received a pre-moistened tissue with the optical module. Remove this tissue from its package and wipe the end of the fiber connector before mating it to the module.



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## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
0.1	Preliminary Version	Feb 06
1.0	Released: Updated descriptions of Fill Input and added VistaLINK <sup>®</sup> screen shots	Jan 08
1.1	Updated section 5.5.25	Apr 08

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## 1. OVERVIEW

The 7725VBI-K-HD module is a multi-function VBI keyer. Every program input vertical interval video line can be programmed to pass upstream video, blank the line, insert any VBI line from the HD/SD Fill input, insert a selectable VITS (vertical interval test signal) for SD, and insert user selected data such as Wide Screen Signaling (WSS) and Active Format Description (AFD). The 7725VBI-K-HD allows for up to 70 lines to be programmed. The module provides the capability to store different VBI configurations as presets and recall them from the On-Screen Display (via Program Monitor Out), VistaLINK®, or via 8 opto-isolated GPI inputs.

The 7725VBI-K-HD has two re-clocked program outputs and one program monitor output. The module is often used in critical on-air applications and hence bypass relay protection of the program video path is provided. The 7725VBI-K-HD is setup via the On-Screen Display or VistaLINK®.

VistaLINK® enables remote monitoring, control and configuration capabilities via Simple Network Management Protocol (SNMP). This offers the flexibility to manage operations including signal monitoring and module configuration from SNMP enabled control systems (Manager or NMS) locally or remotely.

The 7725VBI-K-HD occupies one card slot in the 3RU 7700FR-C frame, which will hold up to 15 1-slot modules or the 1RU 7701FR frame, which will hold up to three 1-slot modules.

### Features:

- One serial digital 1.5 Gb/s HD input per SMPTE 292M, or 270 Mb/s SD input per SMPTE 259M
- Two re-clocked HD or SD program outputs
- Video input relay bypass for power failure bypass protection
- One HD input or SD input digital Fill video input
- One HD or SD monitor program output with On-Screen Display
- A comprehensive on screen menu is available to configure the various features of the module
- 128 different presets for storing VBI keying configurations
- Up to 16 line patterns may be captured from any fill input line and stored in User Memories for later insertion on any VBI line
- Up to 70 lines of output video can be programmed
- Each line of VBI independently programmable to pass, blank, insert from fill signal, insert from user memory or insert factory test signals
- On-Air Preset configuration selected with GPI, OSD, or VistaLINK® selection
- Non-volatile memory protects current configuration in case of power loss
- Fully hot-swappable from front of frame

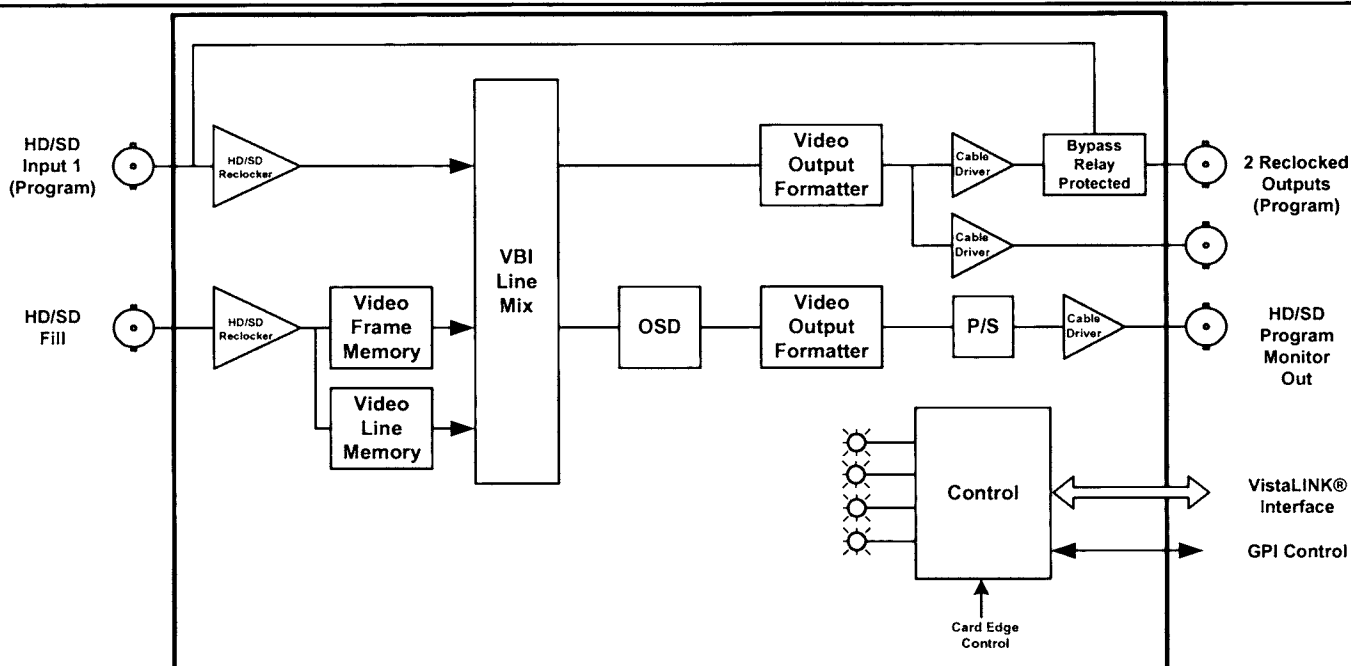


Figure 1-1: 7725VBI-K-HD Block Diagram

The following sections outline several possible applications.

### 1.1. MASTER CONTROL OUTPUT CHAIN PROTECTION

Typically there are several units "chained" together on the output of a master control switcher. Units such as caption encoders, AMOL encoders, VITS inserters, data encoders, etc. are typically connected in a series in the program output path so that if one unit fails the network output will fail. The 7725VBI-K-HD allows you to have one point of insertion in the program output path.

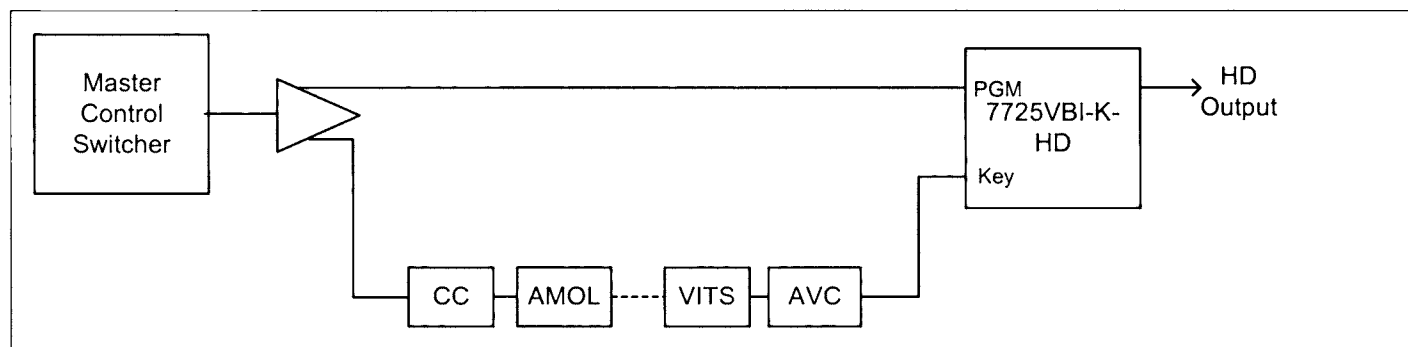
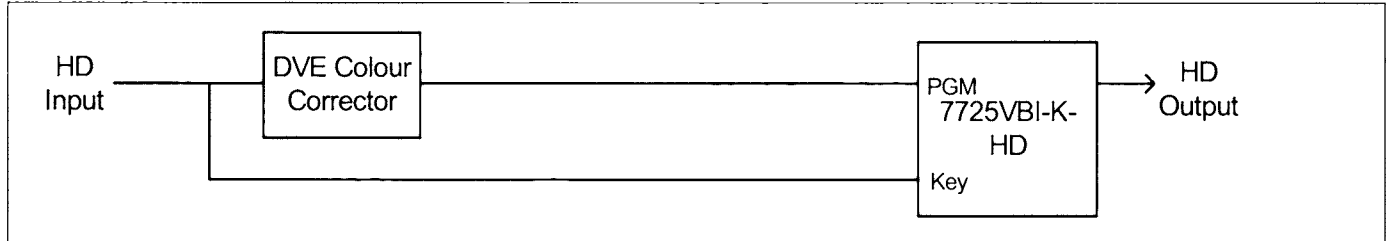


Figure 1-2: Master Control VBI Insertion Application

## 1.2. VANC BRIDGING

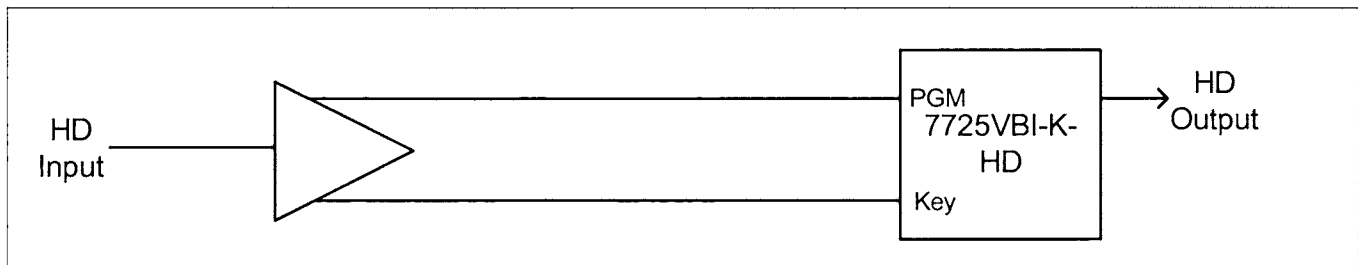
Some processing devices modify or destroy VBI data such as captioning or VITC. An example of this occurs with some DVE's during a squeeze back application or with HD colour correction. The 7725VBI-K-HD device will provide a bypass of VBI around the processing device.



**Figure 1-3: VANC Bridge Application**

## 1.3. VBI LINE SHUFFLER

By providing the same feed to both inputs of the 7725VBI-K-HD, the unit will allow the user to modify the VBI and move lines as necessary.



**Figure 1-4: VBI Line Shuffle Application**



## 2. INSTALLATION

The 7725VBI-K-HD comes with a companion rear plate that has five BNC connectors and one 9 pin female D connector. Modules occupy one slot in the 7700FR-C frame. For more information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

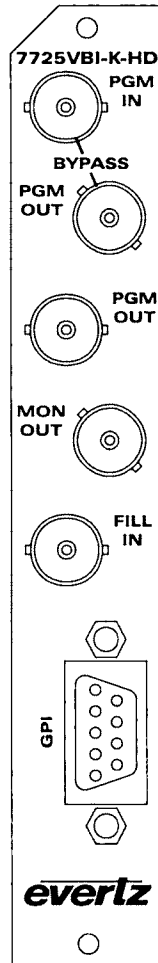


Figure 2-1: 7725VBI-K-HD Rear Panel

### 2.1. VIDEO IN AND OUT

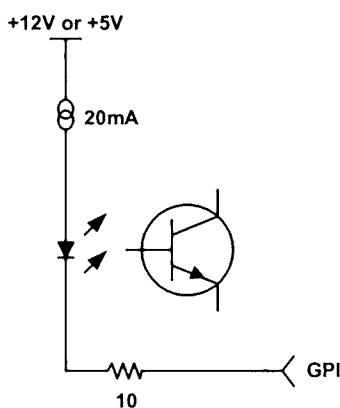
- PGM IN:** Input BNC connector for 10-bit serial digital signals compatible with the SMPTE 292M or SMPTE 259M-C standards. This BNC connector is used to supply the program video to the module.
- FILL IN:** Input BNC connector for 10-bit serial digital signals compatible with the SMPTE 292M or SMPTE 259M-C standards. This BNC connector is used to supply the signal that you want to insert into the VBI of the program video. This input will be referred to as the Fill input throughout this manual.
- PGM OUT:** There are two BNC connectors that contain the PGM input video with the VBI signals inserted. One of these outputs (marked as **BYPASS**) is protected by a bypass relay, which will activate in the event of power loss to the module.

**MON OUT:** This BNC connector contains the PGM input video with the VBI signals and is used for monitoring purposes. The HD/SD output is also used to display the On Screen Display.

## 2.2. GENERAL PURPOSE INPUTS

Table 2-1 shows the pinout of the 9 pin Female D GPI connector. The GPI inputs are active low. This means that if you leave an input floating (not connected) then it will not be activated. The user can activate GPIs simply by connecting the GPI input pins to Ground using a button, switch, relay or an open collector transistor. The inputs are internally pulled up to either +5 or +12 volts DC set by jumper J16.

Figure 2-2 shows the input circuit for the General Purpose inputs. The *GPI Mode* menu item is used to configure the operation of the GPI inputs. (See section 5.7)



**Figure 2-2: GPI Input Circuitry**

DB-9	Name	Description
1	GPI8	General Purpose Input 8
2	GPI4	General Purpose Input 4
3	GND	Ground
4	GPI3	General Purpose Input 3
5	GPI2	General Purpose Input 2
6	GPI5	General Purpose Input 5
7	GPI6	General Purpose Input 6
8	GPI7	General Purpose Input 7
9	GPI1	General Purpose Input 1
Shell	Ground	Ground

**Table 2-1: GPI Pinouts**

### **3. SPECIFICATIONS**

#### **3.1. SERIAL VIDEO INPUT**

**Standard:** Auto-detect  
SMPTE 292M (1080i/59.94, 1080i/60, 1080i/50, 1080p/23.98, 1080p/23.98sF, 720p/59.94, 720p/60, and 720p/50)  
SMPTE 259M-C (525i/59.94, 625i/50)

**Number of Inputs:** 1 for Program video (PGM)  
1 for Fill Signal to insert (FILL)  
PGM and FILL need to be synchronous and timed w.r.t. each other (+/- 1/2 line)

**Connector:** BNC input per IEC 60169-8 Amendment 2

**Equalization:** Automatic 125m @ 1.5 Gb/s with Belden 8281 or equivalent cable

**Return Loss:** > 14 dB (PGM input)

#### **3.2. SERIAL VIDEO OUTPUTS**

**Number of Outputs:** 3 (re-clocked for program, 1 bypass protection) same as input  
1 (program monitor) same as input

**Connector:** BNC per IEC 60169-8 Amendment 2

**Signal Level:** 800mV nominal

**DC Offset:** 0V  $\pm$ 0.5V

**Rise and Fall Time:** 200ps nominal (HD)

**Overshoot:** <10% of amplitude

**Wide Band Jitter:** < 0.13UI

**Return Loss:** > 15 dB

#### **3.3. GENERAL PURPOSE INPUTS**

**Number of Inputs:** 8

**Type:** Opto-isolated, active low with internal pull-ups to +5 or +12V (jumper settable)

**Connector:** Female DB-9

**Input signal:** Closure to ground

#### **3.4. ELECTRICAL**

**Voltage:** +12VDC

**Power:** 10 Watts.

**EMI/RFI:** Complies with FCC regulations for class A devices.  
Complies with EU EMC directive.

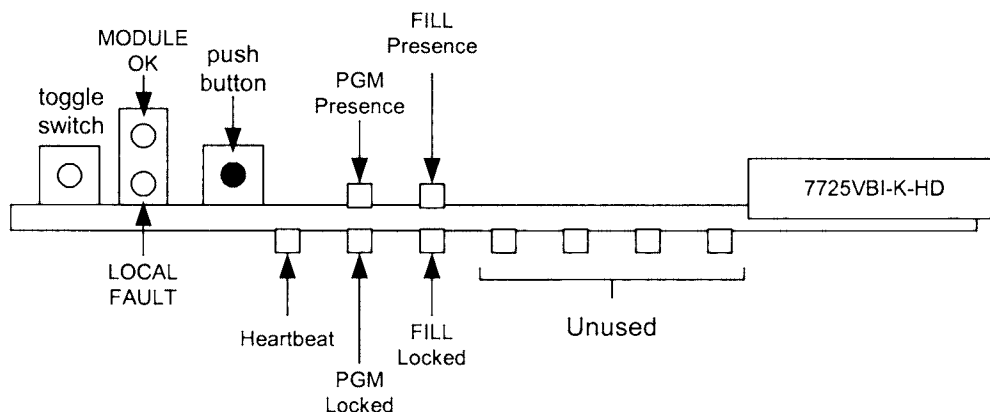
#### **3.5. PHYSICAL**

**7700 or 7701 frame mounting:**  
**Number of slots:** 1

## 4. STATUS INDICATORS

### 4.1. STATUS INDICATOR

The 7725VBI-K-HD has 11 LED status indicators on the front of the card edge to show operational status of the card at a glance. Figure 4-1 displays the location of the LEDs and card edge controls.



**Figure 4-1: Status LED Locations**

There are two large LEDs that indicate the general health of the module.

**LOCAL FAULT:** This Red LED indicates poor module health and will be On if a local input power fault exists (i.e.: a blown fuse) or if the module fails to boot (e.g.: upgrade jumper left on). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

**MODULE OK:** This Green LED indicates good module health. It will be On when the board power is good and the module has booted successfully.

The remaining LED status indicators are listed below:

**HEARTBEAT (RUN):** This Green LED will be blinking when the module is operating normally.

**PGM PRESENCE:** This Green LED indicates the presence of a signal on **PGM IN**.

**PGM LOCKED:** This Green LED indicates a valid standard on **PGM IN**.

**FILL PRESENCE:** This Green LED indicates the presence of a signal on **FILL IN**.

**FILL LOCKED:** This Green LED indicates a valid standard on **FILL IN**.

The other 4 LEDs near the card extractor are for future use.

### 4.2. DIP SWITCHES

The 7725VBI-K-HD has a set of DIP switches accessible from the card edge. These are currently reserved for future use.

## 5. ON SCREEN MENUS

### 5.1. NAVIGATING THE ON SCREEN MENU SYSTEM

A toggle switch and pushbutton at the front card edge are used to navigate a set of on-screen menus, which are used to configure the card. To enter the on-screen menu system, press the pushbutton once. This will bring you to the main setup menu where you can use the toggle switch to move up and down the list of available sub-menus. An arrow (>) moves up and down the left hand side of the menu items to indicate which item you are currently choosing. There is also a line of text at the bottom of the screen to give instructions about the function of the menu item. Once the arrow is on the desired item, press the pushbutton to select the next menu level.

On all menus, there are two extra selectable items: *Back* and *Exit*. Selecting *Back* will take you to the previous menu (the one that was used to get into the current menu) while *Exit* will return the display to its normal operating mode. On the main menu, BACK and EXIT will both take you to the normal operating mode.

Once in a sub-menu, there may be another menu layer, or there may be a list of parameters to adjust. If there is another set of menu choices, use the toggle switch to select the desired menu item and press the pushbutton.

To adjust any parameter, use the toggle switch to move up or down to the desired parameter and press the pushbutton. The arrow will move to the right hand side of the line (<) indicating that you can now adjust the parameter. Using the toggle switch, adjust the parameter to its desired value. If the parameter is a numerical value, the number will increase if you lift the toggle switch and decrease if you push down on the toggle switch. If the parameter contains a list of choices, you can cycle through the list by pressing the toggle switch in either direction.

When you have stopped at the desired value, depress the pushbutton. This will update the parameter to the selected value and move the arrow back to the left side of the parameter list (>). Continue selecting and adjusting other parameters or use the *Back* or *Exit* commands.

Throughout the descriptions of the On Screen Menu items, default values are shown in underlined text.

## 5.2. ON SCREEN DISPLAY – MAIN MENU

Table 5-1 provides a brief description of the top level of the menu tree that appears when you enter the OSD menu. Selecting one of these items will take you down into the next menu level. Sections 5.3 to 5.8 provide detailed descriptions on each of the sub-menus.

<i>Module Status</i>	Shows the status of the module (input presence, video standard, etc.)
<i>User Line Capture</i>	Used to capture signals to the User Signal Memories
<i>Edit Presets</i>	Main configuration section used to configure each of the 128 Presets
<i>Active Preset Number</i>	Selects which preset is active
<i>Preset GPI Mode</i>	Configures the mode of the GPI
<i>Utilities</i>	Miscellaneous utilities such as firmware version, firmware upgrade, and clearing out the preset and user capture memories

**Table 5-1: Menu Tree**

## 5.3. DISPLAYING THE MODULE STATUS

The *Module Status* menu item is used to display the current status of the module. A screen with the following options will be displayed:

<b>PGM Video</b>	Displays the presence of input video
<b>PGM Standard</b>	Displays the detected standard (also operating standard of the module)
<b>Fill Video</b>	Displays the presence of input fill video
<b>Fill Standard</b>	Displays the detected standard of the fill video
<b>Fill to PGM Delay</b>	Displays the detected delay from the fill video to the PGM video
<b>Preset Control</b>	Displays if the preset is being set from GPI or manually from the menu
<b>Active Preset</b>	Displays the active preset number

**Table 5-2: Module Status**

## 5.4. CONFIGURING USER CAPTURE LINES

The 7725VBI-K-HD has the ability to capture up to 24 line patterns from any VBI line of the fill and store them in memory locations for later insertion on any VBI line of the program video. The *User Capture Line* menu is used to capture signals to the various user memories. Sections 5.4.1 to 5.4.3 gives detailed descriptions of the menu items.

<i>Fill Video Line Number</i>	Selects the line number of the fill video signal that will be captured.
<i>Memory Destination Number</i>	Selects the user memory location where the signal will be stored.
<i>Start the Line Capture</i>	Enables the line capture function.

### 5.4.1. Selecting the Fill Video Line Number

<i>User Line Capture</i>	Selects the line number of the fill input video that will be captured.
<i>Fill Video Line Number</i>	
<u>1</u>	The range of lines is based on the video standard of the input Fill video signal that is applied to the module.
1 to Max Line	

### 5.4.2. Selecting the Memory Destination for Capture Line

<i>User Line Capture</i>	Selects the memory location to which the captured line from the fill input video is stored.
<i>Memory Destination Number</i>	
<u>1</u>	The memory location range is 1 to 16.
1 to 16	

### 5.4.3. Capturing the Line from Fill Video Input

<i>User Line Capture</i>	This parameter will enable the line capture function.
<i>Start the Line Capture</i>	
<u>Cancel</u>	When set to Yes, the 7725VBI-K-HD will begin to capture the line from the Fill input video. This operation MAY take a few seconds to complete. Once the operation is complete, the module will return to the <i>User Line Capture</i> menu.
Yes	When <i>Cancel</i> is selected, the capture function is not enabled and the user is returned to the <i>User Line Capture</i> menu.



**The capture process MAY take a few seconds to complete.**

## 5.5. CONFIGURING USER PRESETS

The 7725VBI-K-HD has 128 presets to store VBI Line Configuration. Each preset contains a complete set of (up to 70) VBI line signal settings. The *Edit Presets* menu is used to configure each of the preset memories. Sections 5.5.1 to 5.5.3 provides detailed descriptions of the menu items.

<i>Edit Preset Number</i>	Selects the preset that will store the configuration.
<i>Edit Preset Configuration</i>	Selects the desired processing for each VBI line of the preset
<i>Display Preset Configuration</i>	Provides a quick overview of the preset and shows the processing for all VBI lines.

### 5.5.1. Selecting the Preset Number to Edit or View

<i>Edit Presets</i>	Selects one of the 128 presets to edit or view the configuration.
<i>Edit Preset Number</i>	
<u>0</u> 0 to 127	The range of memory locations is 0 to 127.

### 5.5.2. Configuring the VBI Processing for a Preset

There are a number of parameters that can be configured for each preset. These parameters include: *Output Line*, *Line Source*, *Source Line Number*, and the *additional delay*. The user can configure up to 70 lines per preset. Sections 5.5.2.1 to 5.5.2.5 describe each parameter in further detail.

#### 5.5.2.1. Selecting the VBI Line of the Program Output

<i>Edit Presets</i>	Selects a particular VBI line of the program output video. The permitted line numbers include lines for both field 1 and field 2 of the input video standard. The valid VBI lines are shown below:		
<i>Edit Presets Configuration</i>			
<i>Output Line Number</i>			
<u>1</u> 1 to 70			

	Field 1	Field 2
1080i	7-31, 554-563	570-594, 1114-1125
720p	7-56, 731-750	
NTSC	8-32, 254-263	271-295, 516-525
PAL	6-30, 303-312	319-343, 616-625



### 5.5.2.2. Selecting the Signal Source for a VBI Line

Edit Presets
Edit Presets Configuration
Line Source
Program Video
Fill Video
User Line Capture
Factory Line
Blank Line

This control enables the user to select the source line that is to be keyed onto the selected VBI Line.

Selecting *Program Video* will pass the video through the program video unchanged.

Selecting *Fill Video* will insert a line from the Fill video over the program video. Select the specific line of the Fill video that you wish to insert using the *Source Line Number* menu item.

Select *User Line Capture* to insert a line from one of the User Memories over the program video. Select the specific User memory that is to be inserted using the *Source Line Number* menu item.

Select *Factory Line* to insert one of the factory supplied signals over the program video. Select the specific factory signal that is to be inserted using the *Source Line Number* menu item.

Select *Blank Line* to blank the selected line of the program video.

### 5.5.2.3. Selecting the Signal Line Number to Insert

Edit Presets
Edit Presets Configuration
Source Line Number
<u>1</u>
1 to Max

The function of this menu item depends on the setting of the *Line Source* menu item.

When *Line Source* is set to *Program Video*, this menu item does nothing. The module will simply pass the program video. The range of the parameter will depend on the input video standard.

When *Line Source* is set to *Fill Video*, this parameter selects a particular line of the fill video to insert. The permitted line numbers include lines for both field 1 and field 2 of the input video standard. The range of the parameter will depend on the input fill video standard.

When *Line Source* is set to *User Line Capture*, this parameter selects a captured line stored in one of the user memories for future insertion. The range of the parameter will be 1 to 16.

When *Line Source* is set to *Factory Line*, this parameter selects one of the factory supplied SD signals for future insertion. See Table 5-3 for a list of the Factory supplied test signals and their signal numbers.

#### 5.5.2.4. Selecting the Amount of Delay to Add to the Source Line

Edit Presets

Edit Presets Configuration

Add Frames of Delay

0

0 to 6

This menu item allows the user to add one or more frames of delay to the Fill Video line before it is inserted. This menu only has effect when the *Line Source* menu item is set to *Fill Video*.

#### 5.5.2.5. Factory Supplied SD Test Signals

The following SD test signals are available within the 7725VBI-K-HD. For frame rates of 59.94Hz and 60Hz, NTSC test signals will be used. For frame rates of 50Hz, PAL test signals will be used.

	Name	Name
Number	NTSC	PAL
1	100% White	100% White
2	50% Gray	50% Gray
3	75% SMPTE Colourbars	CCIR Line 17
4	100% SMPTE Colourbars	CCIR Line 18
5	FCC Composite	CCIR Line 330
6	FCC Multiburst	CCIR Line 331
7	GCR System C	75% Colourbars
8	GCR Waveform	100% Colourbars
9	Linear 5 Step Staircase	GCR System C
10	Multiburst 100% / 4.2 MHz	Linear 5 Step Staircase
11	Multiburst 60% / 4.2 MHz	Multiburst 100% / 5.8 MHz
12	Modulated 5-Step Staircase	Multiburst 60% / 5.8 MHz
13	Modulated Ramp	Modulated Staircase
14	Multipulse 4.2 MHz	Pulse & Bar
15	NTC7 Combination	Modulated Ramp
16	NTC7 Composite	Ramp
17	Ramp	Shallow Ramp
18	Red Line	Sin (X)/X
19	Shallow Ramp	Sweep 60% to 5.5 MHz
20	Sin (X)/X 4.75 MHz	Sweep 100% to 5.5 MHz
21	Sweep 60% / 4.2 MHz	Black
22	Sweep 60% / 5.5 MHz	Black
23	Valid Ramp	Black
24	VIRS	Black
25	75% Full Field Colourbars	Black
26	100% Full Field Colourbars	Black
27	Black	Black
28	Black	Black
29	Black	Black
30	Black	Black
31	Black	Black
32	Black	Black

**Table 5-3: Factory Programmed SD Test Signals**

### 5.5.3. Displaying Preset Configurations

The *Display Preset Configuration* under the *Edit Presets* menu allows the user to view the complete configuration for the preset number specified under section 5.5.1. The OSD will display the *Output Line Number*, *Video Line Number*, *Line Source*, *Source Line Number* and *Frames of Delay*.

## 5.6. SELECTING AN ACTIVE PRESET

The 7725VBI-K-HD module has 128 memory locations to store user defined VBI Line Configuration presets. Each preset contains a complete set of VBI line signal settings.

<b>Active Preset Number</b>
-----------------------------

<u>GPI</u>
------------

GPI, 0 to 127
---------------

This menu item allows the user to determine the active preset or to configure the GPI inputs to recall the active preset.

When this menu item is set to one of the preset numbers, that preset will become active when you press the pushbutton.

When this menu item is set to *GPI*, then the GPI inputs will control which preset is active. The GPI inputs operate in one of two modes controlled by the *GPI Mode* menu item.

## 5.7. CONFIGURING THE GPI MODE

<b>Preset GPI Mode</b>
------------------------

<u>One-Hot</u>
----------------

Binary
--------

The 7725VBI-K-HD has 8 GPI inputs that can be used to recall one of the presets remotely. This menu item is used to configure one of two GPI modes.

When this menu item is set to *One-Hot* the 8 GPI inputs will activate presets 1 to 8 respectively when they are closed to ground. Preset 0 will be selected when none of the GPIs are active

When this menu item is set to *Binary*, the GPI inputs 1 to 7 are binary encoded to select one of the 128 presets. When GPI input 8 is closed to ground, then the preset selected by GPI inputs 1 to 7 will become active.

## 5.8. CONFIGURING MISCELLANEOUS FUNCTIONS

The *Utilities* menu is used to configure various miscellaneous items.

<i>Upgrade</i>
<i>Factory Reset</i>
<i>Reset User Line Captures</i>
<i>About...</i>

Allows the user to upgrade the module firmware
--

Clears all the Card Configuration menus and sets the Presets to pass all VBI lines. It will not clear memory containing User Line Captures.
---

Clears all memory containing User Line Captures.
--

Displays the module firmware and hardware version information.
--

### 5.8.1. Initiating a Software Upgrade

Utilities
Upgrade
Yes
Cancel

This menu item is used to initiate an upgrade of the module firmware.

In addition to the firmware upgrade support detailed in this manual (See the *Upgrading Firmware* section of this manual for more information), you can initiate an upgrade with this command. This will allow you to upgrade the software without unplugging the card and changing the upgrade jumper.

After selecting the upgrade operation, you must change the command to Yes and press the pushbutton before the upgrade can take place. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

After the upgrade has finished, the unit will automatically restart and run in normal operating mode.

### 5.8.2. Restoring the Module to its Factory Default Configuration

Utilities
Factory reset
Yes
Cancel

This menu item is used to restore all controls back to their factory defaults.

After selecting the reset operation, you must change the command to Yes and press the pushbutton before the command takes place. After the command, all parameters will be set to their factory default. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.



**Factory reset will NOT clear memory containing User Line Captures.**

### 5.8.3. Clearing the Memory containing User Line Captures

Utilities
Clear User Line Captures
Yes
Cancel

This menu item is used to remove all captured lines from the User memories.

After selecting the clear operation, you must change the command to Yes and press the pushbutton before the command takes place. After the command, all user memories will be cleared. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

### 5.8.4. Accessing Information About this Module and its Firmware

Utilities
About...

This menu item lists the particulars about this module and the firmware residing within it. It gives quick access to information about revisions that can be used to determine when upgrades are required.

## 6. JUMPERS AND LOCAL CONTROLS

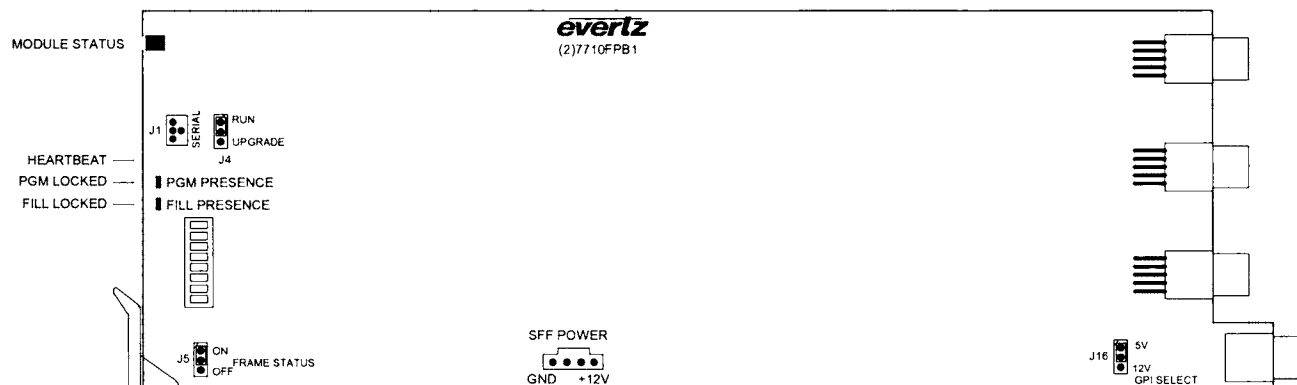


Figure 6-1: Location of Jumpers on Main Board (Rev. 2)

### 6.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper J5, located at the front of the main board, determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

**FRAME STATUS** To monitor faults on this module with the frame status indicators (on the Power Supply FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position. (default). When this jumper is installed in the Off position local faults on this module will not be monitored.

### 6.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

**UPGRADE** The UPGRADE jumper located on the top module at the bottom, front is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. Firmware upgrades can also be initiated from the *Utilities* menu (See section 5.8.1) See the *Upgrading Firmware* section in the front of the binder for more information.

To upgrade the firmware in the module using the manual procedure, pull the module out of the frame. Move the jumper into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto the SERIAL header at the card edge. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* section in the front of the manual binder. Once the upgrade is complete, remove the module from the frame, move the jumper into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

To upgrade the firmware in the module using the *Upgrade* menu item, install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto the SERIAL header at the card edge. Go to the *Upgrade* menu item as described in section 5.8.1. Complete the upgrade as described in sections 1.2.1.2 to 1.2.1.4 of the *Upgrading Firmware* section of this manual binder. Once the upgrade is complete, remove the upgrade cable. The module is now ready for normal operation.

## **7. VISTALINK<sup>®</sup> REMOTE MONITORING/CONTROL**

### **7.1. WHAT IS VISTALINK<sup>®</sup>?**

VistaLINK<sup>®</sup> is Evertz's remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. VistaLINK<sup>®</sup> provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through VistaLINK<sup>®</sup> PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, VistaLINK<sup>®</sup> enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz *VistaLINK<sup>®</sup> Pro Manager* graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz VistaLINK<sup>®</sup> enabled products.
2. Managed devices (such as 7725VBI-K-HD), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK<sup>®</sup> enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK<sup>®</sup> frame controller module, which serves as the Agent.
3. A virtual database, known as the Management Information Base (MIB), lists all the variables being monitored, which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the VistaLINK<sup>®</sup> network, see the 7700FC Frame Controller chapter.

## 7.2. VISTALINK GUI SCREENS

The following screen shots show the VistaLINK® GUI screens.

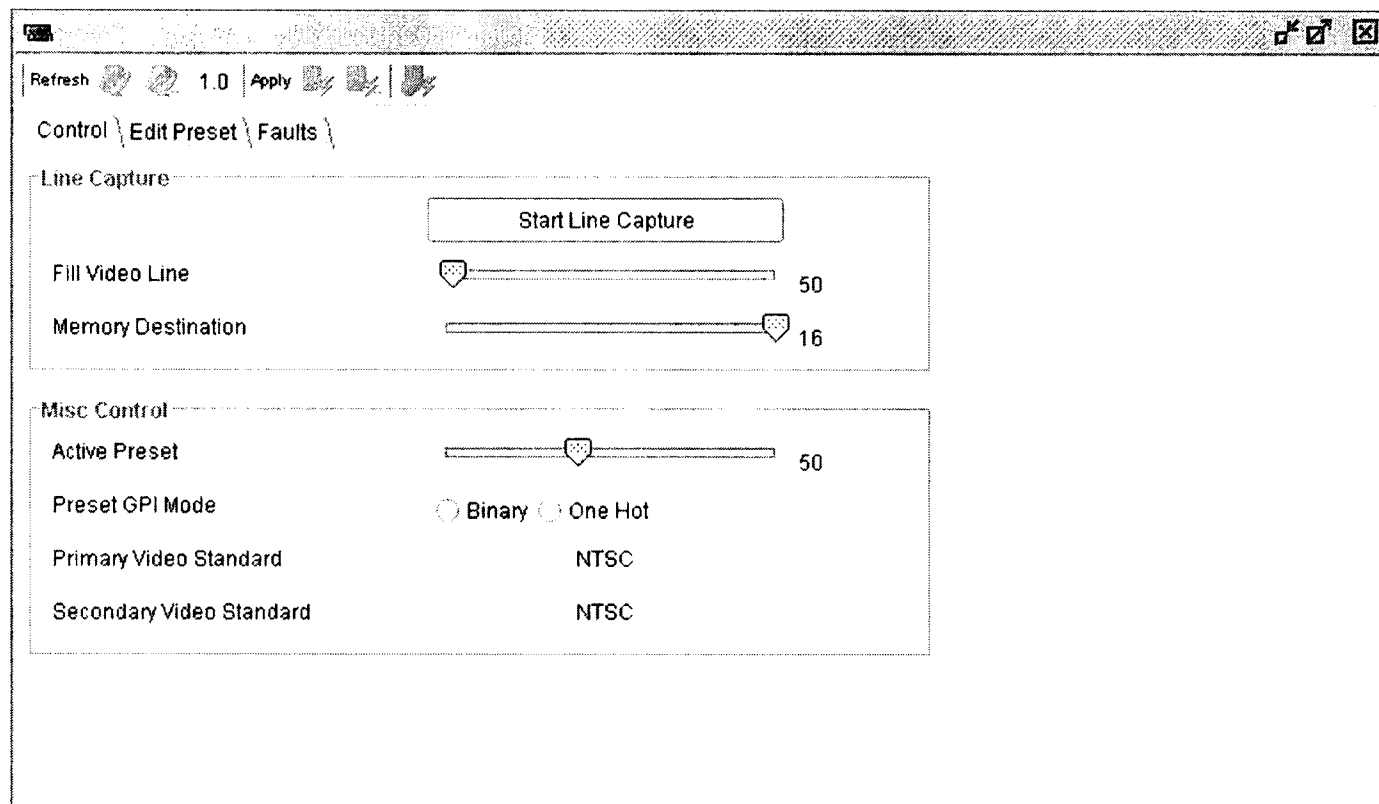


Figure 7-1: Control Tab

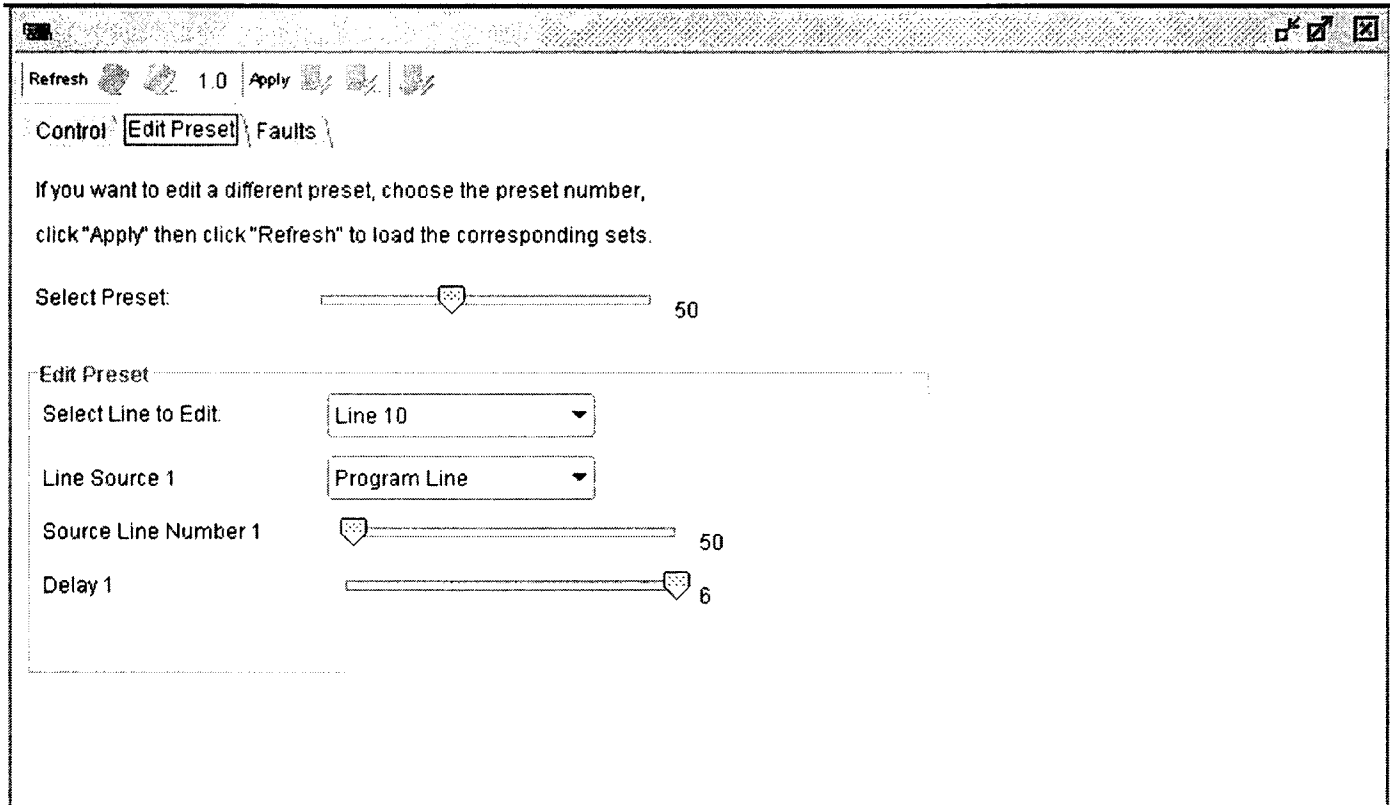


Figure 7-2: Edit Preset Tab

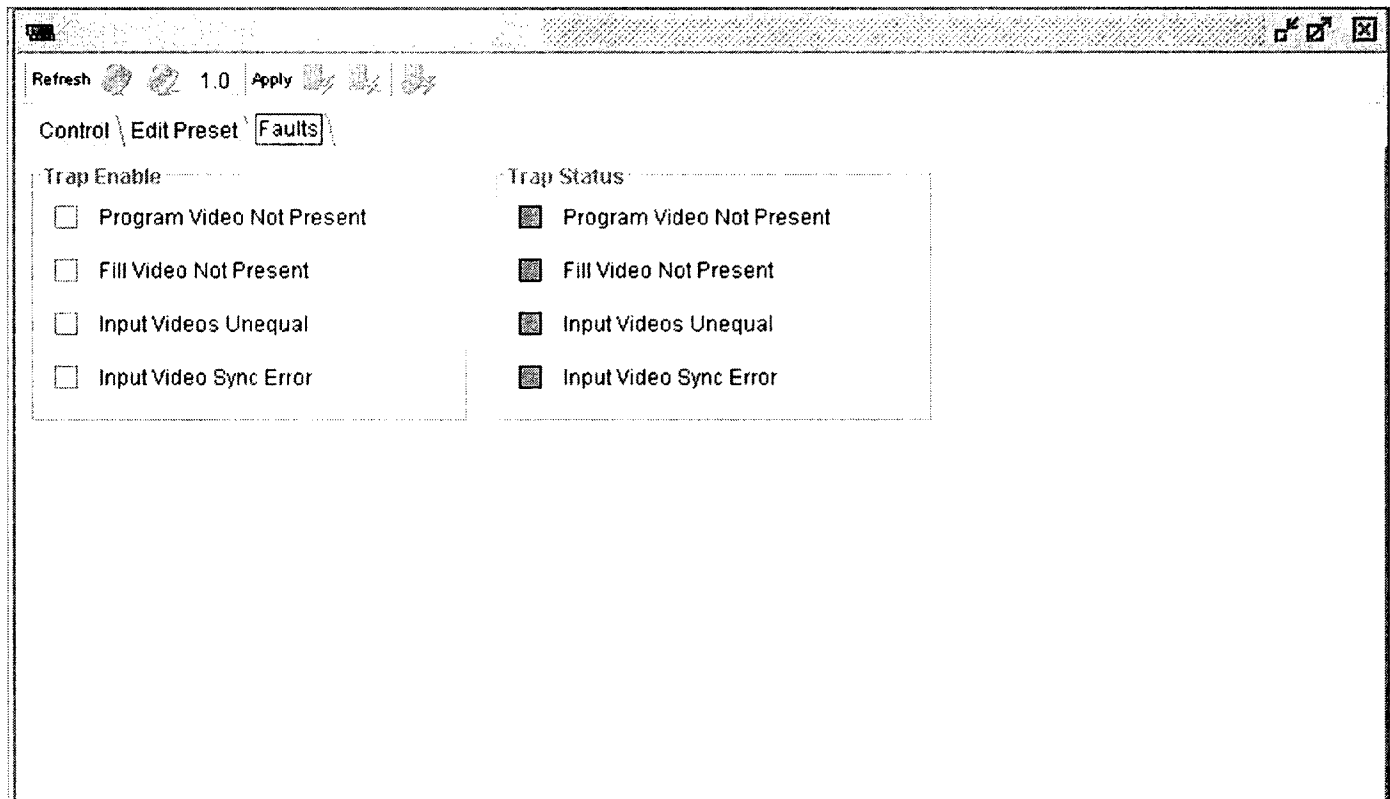


Figure 7-3: Faults Tab



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## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
0.1	Preliminary Version	Sep 03
1.0	First release with VistaLINK® support, add video standard DIP switches	Oct 03
1.1	Add Genlock specifications, updated jitter specs	Oct 03
1.2	Updated delay and jitter specs	Feb 04
1.3	Added 7743DLY-HD module	Mar 04
1.3.1	Fixed Incorrect DIP switch documentation for 7743DLY-HD (Table 6-2) Fixed MODULE OK LED description	Jul 04
1.4	Updated Video Genlock Standard switch settings and Monitored Parameters	May 08

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Although every attempt has been made to accurately describe the features, installation and operation of this product in this manual, no warranty is granted nor liability assumed in relation to any errors or omissions unless specifically undertaken in the Evertz sales contract or order confirmation. Information contained in this manual is periodically updated and changes will be incorporated into subsequent editions. If you encounter an error, please notify Evertz Customer Service department. Evertz reserves the right, without notice or liability, to make changes in equipment design or specifications.

## 1. OVERVIEW

The 7740DLY-HD series modules are full function HD Video Delay modules designed for applications such as: satellite uplink, signal re-entry on master control inputs, at cable headends, mobile vehicle outputs, broadcast transmitter inputs, virtual sets and matching delays caused by multi-channel audio compression.

There are two models available with different amounts of delay possible. The 7743DLY-HD also can act as a delay for standard definition SMPTE 259M video. Both versions will be referred to as the 7740DLY-HD throughout this manual except where there are specific differences in the products.

Model	Video Standard	Delay Range
7742DLY-HD (Discontinued)	HD SDI (SMPTE 292M)	37 $\mu$ s up to 1.6 seconds
7743DLY-HD	SDI (SMPTE 259M)	65 $\mu$ s up to 16.5 seconds
	HD SDI (SMPTE 292M)	37 $\mu$ s up to 3.3 seconds



**As of July 2004 the 7742DLY-HD has been discontinued, but the documentation is included here for customers with existing units.**

The 7740DLY-HD modules will delay all VBI and Ancillary data including embedded audio along with the video. The delay can be set in frames, lines and samples or in seconds.

With the broadcast environment in mind, the modules feature bypass relay protection to one output. The 7740DLY-HD modules are housed in a 3RU frame that will hold up to seven 7740DLY-HD series modules or a 1RU frame that will hold up to 3 modules.

### Features:

- Full signal delay capability including VBI and ANC DATA for SMPTE 292M (1.5Gb/s) signals
- 7743DLY-HD also supports full signal delay capability including VBI for SMPTE 259M (270Mb/s) signals
- Delay programmable in video units (frames, lines, and samples) or as time units (seconds)
- Auto senses video standard
- Bypass relay for program path protection on power loss
- Card edge controls operate on screen menu system to program delay settings
- VistaLINK<sup>®</sup> - enabled offering remote control and configuration capabilities via SNMP using VistaLINK<sup>®</sup> Pro or 9000NCP Network Control Panel. VistaLINK<sup>®</sup> is available when modules are used with the 3RU 7700FR-C frame and a 7700FC VistaLINK<sup>®</sup> Frame Controller module in slot 1 of the frame

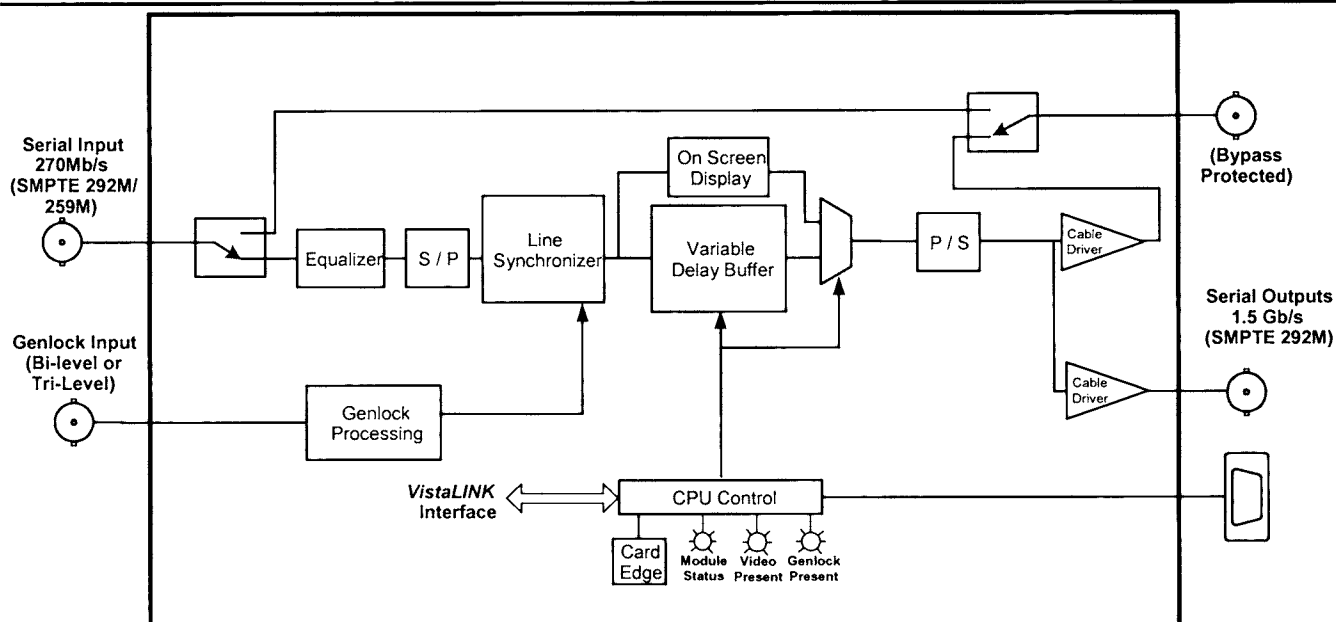
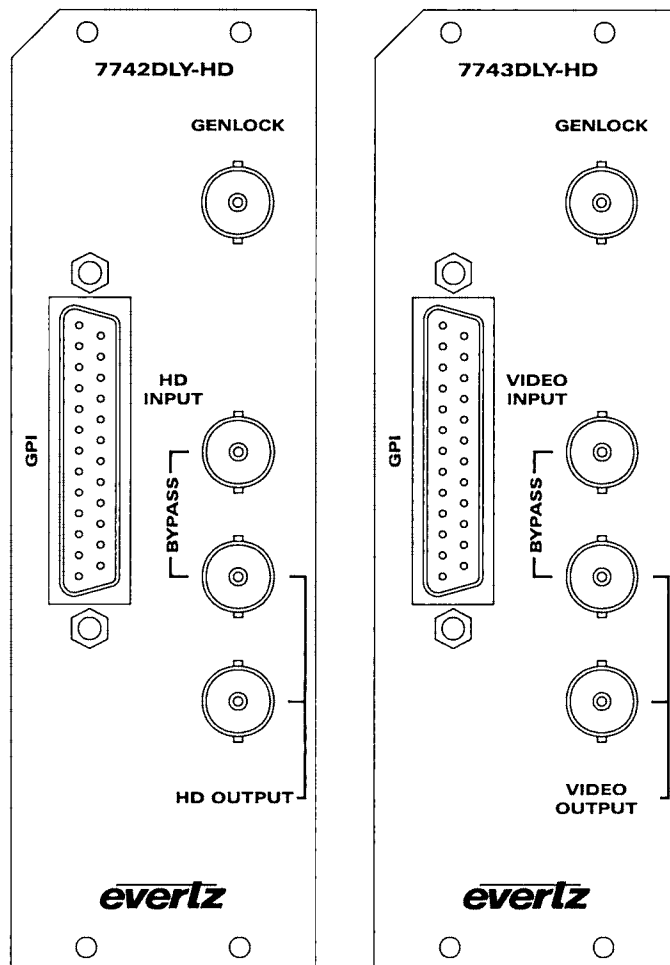


Figure 1-1: 7740DLY-HD Series Block Diagram

## 2. INSTALLATION

The 7740DLY-HD series modules come with a companion rear plate that has 4 BNC connectors and a 25 pin D connector and occupy two slots in the frame. For information on mounting the rear plate and inserting the module into the frame see the 7700FR chapter section 3.



**Figure 2-1: 7740DLY-HD Series Rear Panels**

### 2.1. VIDEO CONNECTIONS

**HD INPUT( VIDEO INPUT):** Input BNC connector for 10-bit serial digital video signals. The 7742DLY-HD supports signals compatible with the SMPTE 292M (1.5 Gb/s) standard. The 7743DLY-HD supports signals compatible with the SMPTE 259M (270 Mb/s) and SMPTE 292M (1.5 Gb/s) standards.

**HDI OUTPUT (VIDEO OUTPUT):** Two BNC serial digital video outputs are provided. Output 1 is protected by a bypass relay, which will activate in the event of power loss to the module. The remaining output is not bypass protected.



## 2.2. GENLOCK REFERENCE

**GENLOCK:** This BNC is used to connect a video or tri-level sync reference. The genlock signal may be NTSC or PAL colour black, or tri-level sync and is auto-detected by the module. The genlock standard must be set using the DIP switches 1 to 3. (See section 5.1) Jumper J9 on the 7700CC sub-module selects whether the reference input is terminated to 75 ohms or high impedance (default). (See section 8.3). The output video can be timed with respect to the genlock video using the *Reference Phase* menu items. (See section 7.2.1) When no Genlock is provided, the output video is timed with respect to the input video. In order to meet the jitter tolerance specifications outlined in section 3.2 a genlock reference must be applied.

## 2.3. GENERAL PURPOSE INPUTS

A 25 pin D connector labeled GPI contains 8 GPI inputs. The connector pinout is shown in Table 2-1.

Pin #	Name	Description
1	-	Not used
2	-	Not used
3	GPI 0	Bypass Relay Enable
4	GPI 1	Future use
5	-	Not used
6	-	Not used
7	-	Not used
8	-	Not used
9	-	Not used
10	-	Not used
11	GPI 2	Future use
12	GPI 3	Future use
13	GPI 4	Future use
14	GPI 6	Future use
15	GPI 7	Future use
16	-	Not used
17	-	Not used
18	-	Not used
19	-	Not used
20	-	Not used
21	GND	Ground
22	-	Not used
23	-	Not used
24	-	Not used
25	GPI 5	Future use
	Shell	Ground

Table 2-1: GPI Connector Pin Definitions

---

### **3. SPECIFICATIONS**

#### **3.1. SERIAL VIDEO INPUT**

##### **3.1.1. High Definition Serial Digital Video**

**Standard:** SMPTE 292M (1.5 Gb/s)  
**Connector:** BNC per IEC 60169-8 Amendment 2.  
**Equalization:** Automatic to 75m @ 1.5 Gb/s with Belden 1694 or equivalent cable  
**Return Loss:** > 15 dB up to 1.0 Gb/s  
> 10 dB up to 1.5 Gb/s (with relay)

##### **3.1.2. Standard Definition Serial Digital Video (model 7743DLY-HD only)**

**Standard:** SMPTE 259M (270 Mb/s)  
**Connector:** BNC per IEC 60169-8 Amendment 2.  
**Equalization:** Automatic  
**Max. Cable Length:** Automatic to 300m @ 270 Mb/s with Belden 8281 or equivalent cable  
**Return Loss:** > 15 dB up to 270 Mb/s

#### **3.2. SERIAL VIDEO OUTPUTS**

##### **3.2.1. HD Serial Digital Video**

**Number of Outputs:** 1 with relay bypass, 1 additional output.  
**Connector:** BNC per IEC 60169-8 Amendment 2.  
**Signal Level:** 800mV nominal  
**DC Offset:** 0V  $\pm$ 0.5V  
**Rise and Fall Time:** 200ps nominal  
**Overshoot:** <10% of amplitude  
**Return Loss:** > 15 dB up to 1.5 Gb/s  
**Wide Band Jitter:** < 0.2 UI

##### **3.2.2. Standard Definition Serial Digital Video (model 7743DLY-HD only)**

**Number of Outputs:** 1 with relay bypass, 3 additional outputs.  
**Connector:** BNC per IEC 60169-8 Amendment 2.  
**Signal Level:** 800mV nominal  
**DC Offset:** 0V  $\pm$ 0.5V  
**Rise and Fall Time:** 740ps nominal  
**Overshoot:** <10% of amplitude  
**Return Loss:** > 15 dB up to 540 Mb/s  
**Wide Band Jitter:** < 0.2 UI

### **3.3. GENLOCK INPUT**

**Type:** HD Tri-level Sync, (See Table 5-2)  
NTSC or PAL Colour Black 1 V p-p, or  
Composite bi-level sync (525i/59.94 or 625i/50) 300 mV

**Connector:** BNC per IEC 60169-8 Amendment 2.

**Termination:** 75 ohm (jumper selectable)

### **3.4. FUNCTIONAL**

**Minimum Delay:**

**7742DLY-HD:** 37.7  $\mu$ sec (2800 samples)

**7743DLY-HD:** 65.5  $\mu$ sec (1770 samples) for standard definition,  
37.7  $\mu$ sec (2800 samples) for high definition

**Maximum Delay:**

**7742DLY-HD:** approx. 1.67 sec

**7743DLY-HD:** approx. 16.5 sec for standard definition  
approx. 3.2 sec for high definition

### **3.5. ELECTRICAL**

**Voltage:** + 12VDC

**Power:** 20 watts

**EMI/RFI:** Complies with FCC regulations for class A devices.  
Complies with EU EMC directive.

### **3.6. PHYSICAL**

**7700 frame mounting:**  
**Number of slots:** 2

**7701 frame mounting:**  
**Number of slots:** 1

**Stand Alone Enclosure:**

**Dimensions:** 14 " L x 4.5 " W x 1.9 " H  
(355 mm L x 114 mm W x 48 mm H)

**Weight:** approx. 1.5 lbs. (0.7 Kg)

## **4. STATUS LEDS**

The 7740DLY-HD has 2 LED Status indicators on the main circuit board and 2 indicators on the sub-module to show operational status of the card at a glance. Figure 8-1 and Figure 8-2 show the location of the LEDs and card edge controls.

Two large LEDs on the front of the main board indicate the general health of the module:

**LOCAL FAULT:** This Red LED indicates poor module health and will be On during the absence of a valid input signal or if a local input power fault exists (i.e.: a blown fuse). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

**MODULE OK:** This Green LED indicates good module health. It will be On when the board power is good and the module is running normally.

Two LEDs on the sub-module (7700CC) indicate the presence of the video input and genlock signals.

**VIDEO PRESENT:** This Green LED will be ON when there is a valid video signal present at the module input.

**GENLOCK:** This Green LED will be ON when there is a signal present at the module genlock input. This LED does not indicate that a correct signal appropriate for the current video format is present. Refer to Table 5-2 for valid Video format and input Genlock combinations.

## 5. CARD EDGE CONTROLS- 7742DLY-HD

The 7742DLY-HD module is equipped with a 4 position DIP switch on the top edge of the card to allow the user to select various functions. All positions are assigned sequentially such that the DIP switch 1 is located farthest from the front of the card. Table 5-1 gives an overview of the DIP switch functions for the 7742DLY-HD. Sections 5.1 and 5.2 describe the assigned DIP switch functions. The On (closed) position is down, or closest to the printed circuit board. The Off (open) position is up, or farthest from the printed circuit board. There is also a toggle switch and pushbutton which are used to navigate the on screen menu. (See section 7)

DIP Switch	Function
1	Video / Genlock Standard
2	
3	
4	VistaLINK® Control Enable

**Table 5-1: Overview of DIP Switch Functions – 7742DLY-HD**

### 5.1. SELECTING THE VIDEO AND GENLOCK STANDARD – 7742DLY-HD

DIP switches 1, 2 and 3 are used to select the video and genlock standard when there is a genlock signal applied (as shown in Table 5-2). When there is no genlock signal connected, the 7740DLY-HD will auto-detect the video standard in use.

DIP 1	DIP 2	DIP 3	Video Format	Valid Genlock Types	
				Bi-Level	Tri-Level
Off	Off	Off	1080i/59.94 1080p/29.97 1080p/29.97sF 1035i/59.94	525/59.94	1080i/59.94 1080p/29.97 1080p/29.97sF 1035i/59.94
Off	Off	On	1080i/60 1080p/30 1080p/30sF 1035i/60	525/60	1080i/60 1080p/30 1080p/30sF 1035i/60
Off	On	Off	720p/59.94	525/59.94	720p/59.94
Off	On	On	720p/60	525/60	720p/60
On	Off	Off	1080i/50 1080p/25 1080p/25sF	625/50	1080i/50 1080p/25 1080p/25sF
On	Off	On	1080p/23.98 1080p/23.98sF		1080p/23.98 1080p/23.98sF
On	On	Off	1080p/24 1080p/24sF		1080p/24 1080p/24sF
On	On	On	Future use		

**Table 5-2: Video and Genlock Standard Switch Settings – 7742DLY-HD**

## **5.2. SELECTING WHETHER MODULE WILL BE CONTROLLED FROM THE LOCAL CONTROLS OR THROUGH THE VISTALINK® INTERFACE – 7742DLY-HD**

DIP switch 4 selects whether the module will be controlled from the local user controls or through the *VistaLINK®* interface.

<b>DIP 4</b>	<b>VISTALINK CONTROL</b>
Off	The card functions are controlled through the local menus
On	The card functions are controlled through the <i>VistaLINK®</i> interface. (See section 9)

**Table 5-3: VistaLINK® Control Switch Settings – 7742DLY-HD**

## **6. CARD EDGE CONTROLS – 7743DLY-HD**

The 7743DLY-HD module is equipped with a 4 position DIP switch on the top edge of the card to allow the user to select various functions. Table 6-1 gives an overview of the DIP switch functions for the 7742DLY-HD. All positions are assigned sequentially such that the DIP switch 1 is located farthest from the front of the card. Sections 6.1 and 6.2 describe the assigned DIP switch functions. The On (closed) position is down, or closest to the printed circuit board. The Off (open) position is up, or farthest from the printed circuit board. There is also a toggle switch and pushbutton which are used to navigate the on screen menu. (See section 7)

<b>DIP Switch</b>	<b>Function</b>
1	Video / Genlock Standard & <i>VistaLINK®</i> Control Enable
2	
3	
4	

**Table 6-1: Overview of DIP Switch Functions – 7743DLY-HD**

## 6.1. SELECTING THE VIDEO AND GENLOCK STANDARD – 7743DLY-HD

DIP switches 1, 2, 3 and 4 are used to select the video and genlock standard when there is a genlock signal applied (as shown in Table 5-2). When there is no genlock signal connected, the 7743DLY-HD will auto-detect the video standard in use.

DIP 1	DIP 2	DIP 3	DIP 4	Video Format	Valid Genlock Types	
					Bi-Level	Tri-Level
Off	Off	Off	Off	1080i/59.94 1080p/29.97 1080p/29.97sF 1035i/59.94	525i/59.94	1080i/59.94 1080p/29.97 1080p/29.97sF 1035i/59.94
Off	Off	Off	On	1080i/60 1080p/30 1080p/30sF 1035i/60	525i/60	1080i/60 1080p/30 1080p/30sF 1035i/60
Off	Off	On	Off	720p/59.94	525i/59.94	720p/59.94
Off	Off	On	On	720p/60	525i/60	720p/60
Off	On	Off	Off	1080i/50 1080p/25 1080p/25sF	625i/50	1080i/50 1080p/25 1080p/25sF
Off	On	Off	On	1080p/23.98 1080p/23.98sF		1080p/23.98 1080p/23.98sF
Off	On	On	Off	1080p/24 1080p/24sF		1080p/24 1080p/24sF
Off	On	On	On	525/59.94	525i/59.94	
On	Off	Off	Off	625i/50	625i/50	
On	Off	Off	On	720p/50	625i/50	720p/50
On	On	On	Off	Auto-detect		
On	On	On	On	Future use		

**Table 6-2: Video and Genlock Standard Switch Settings – 7743DLY-HD**

## 6.2. SELECTING WHETHER THE MODULE WILL BE CONTROLLED FROM THE LOCAL CONTROLS OR THROUGH THE VISTALINK® INTERFACE – 7743DLY-HD

When all four DIP switches are On the module will be controlled through the VistaLINK® interface. Otherwise it will be controlled through the local interface.

DIP 1	DIP 2	DIP 3	DIP 4	VISTALINK® CONTROL
On	On	On	On	The card functions are controlled through the VistaLINK® interface. (See section 9)

**Table 6-3: VistaLINK® Control Switch Settings – 7743DLY-HD**

## 7. USING THE ON SCREEN MENU

An On screen menu (OSD) is used to configure many of the module's parameters. The three position, return to center, toggle switch and momentary pushbutton located on the front edge of the module are used to navigate the OSD setup menus and configure the card's various controls.

To enter the OSD menu system, press and hold the pushbutton and then press the toggle switch up for 3 seconds. This will bring you to the main setup menu where you can use the toggle switch to move up and down the list of available sub-menus. An arrow (>) moves up and down the left hand side of the menu items to indicate which item you are currently choosing. Once the arrow is on the desired item, press the pushbutton to select the next menu.

On all menus, there is a selectable item *Done*. Selecting *Done* will take you to the previous menu (the one that was used to get into the menu). If you are at the top level of the menu tree then selecting *Done* will exit the OSD menu and return the module to the normal operating mode.

Once you are in a sub-menu, there may be another menu level, or there may be a list of parameters to adjust. If there is another set of menu choices, use the toggle switch to select the next option with the same procedure as in the main menu.

If there is a list of parameters to adjust, use the toggle switch to move up or down to the desired parameter and press the pushbutton. The arrow will move to the right hand side (<) indicating that you can now adjust the parameter. Using the toggle switch, adjust the parameter to its desired value. If the parameter is a numerical value, the number will increase if you lift the toggle switch and decrease if you push down on the toggle switch. If the parameter contains a list of choices, you can cycle through the list by pressing the toggle switch in either direction.

When you have stopped at the desired value, depress the pushbutton. This will update the parameter with the selected value and move the arrow back to the left side of the parameter list. Continue selecting and adjusting other parameters or use the *Done* commands to return to the next higher menu level.

### 7.1. TOP LEVEL MENU STRUCTURE

The following is a brief description of the top level of the menu tree that appears when you enter the On screen menu. Selecting one of these items will take you down into the next menu level.

<i>VIDEO DELAY</i>	Sets the amount of delay.
<i>REFERENCE PHASE</i>	Sets the timing phase of output video to the Genlock reference input.
<i>DONE</i>	Exit On Screen Menu System.

#### 7.1.1. Setting the Video Delay

The *VIDEO DELAY* menu item allows the user to set the video delay. The maximum delay is approximately 1.6 seconds even though it is set using video units (frames, lines and samples). The video delay is set using frame, line or sample increments. Each time the pushbutton is pressed to accept a portion of the total delay, the new video delay will be implemented.



<i>Frame = xxx</i>	Sets the amount of delay in whole numbers of frames
<i>Line = yyy</i>	Sets the amount of delay in whole numbers of lines (the sub-frame)
<i>Sample = zzz</i>	Sets the amount of delay in samples (the sub-line delay)
<i>Done</i>	Return to main menu
<i>Delay = ttt.ddd sec</i>	Displays the amount of delay in seconds

### Step 1: Coarse Adjustment

Press the toggle switch up or down until the right arrow (>) is beside the Frames menu item. Press the pushbutton to set the whole frame delay. The display will show *frames = xxx* where xxx is the frames part of the delay value. Press the toggle switch up or down to adjust the value. Holding the toggle switch will change the value at a faster rate. Press the pushbutton to accept the video frames part of the delay. The arrow (>) will appear back at the left side of the display.

### Step 2: Medium Adjustment

Press the toggle switch down until the right arrow (>) is beside the Lines menu item. Press the pushbutton to set the whole line delay. The display will show *line = yyy* where yyy is the lines part of the delay value. Press the toggle switch up or down to adjust the value. Holding the toggle switch will change the value at a faster rate. Press the pushbutton to accept the video lines part of the delay. The arrow (>) will appear back at the left side of the display.

### Step 3: Fine Adjustment

Press the toggle switch down until the right arrow (>) is beside the Samples menu item. Press the pushbutton to set the sample delay. The display will show *sample = zzz* where zzz is the samples part of the delay value. Press the toggle switch up or down to adjust the value. Holding the toggle switch will change the value at a faster rate. Press the pushbutton to accept the video sample part of the delay. The arrow (>) will appear back at the left side of the display.

Table 7-1 shows the maximum number of video units of delay available for different HD video standards with the 7742DLY-HD. Table 7-2 shows the maximum number of video units of delay available for different HD video standards with the 7743DLY-HD. The calculations are based on the total samples per line shown in Table 7-1 and Table 7-2, and the time per sample which is  $1 / (74.25 \times 10^6)$  seconds. Table 7-5 shows typical conversions between video units and time units for 525 and 625 line video.

Table 7-3 shows the maximum number of video units of delay available for different SD video standards with the 7743DLY-HD. The calculations are based on the total samples per line shown in Table 7-3, and the time per sample which is  $1 / (13.5 \times 10^6)$  seconds. Table 7-4 shows typical conversions between video units and time units for 525 and 625 line video.

Video Type	Lines per frame	Samples per line	Maximum delay			
			Video Units			Time Units
			Frames	Lines	Samples	Seconds
1080i/60	1125	2200	49	1124	2199	1.667
1080i/50	1125	2640	40	1124	2639	1.640
1080p/24	1125	2750	39	1124	2749	1.667
720p/60	750	1650	97	749	1649	1.633

**Table 7-1: Maximum HD Video Delay – 7742DLY-HD**

Video Type	Lines per frame	Samples per line	Maximum delay			
			Video Units			Time Units
			Frames	Lines	Samples	Seconds
1080i/60	1125	2200	101	1124	2199	3.378
1080i/50	1125	2640	83	1124	2639	3.399
1080p/24	1125	2750	80	1124	2749	3.359
720p/60	750	1650	197	749	1649	3.3033

**Table 7-2: Maximum HD Video Delay – 7743DLY-HD**

Video Type	Lines per frame	Samples per line	Maximum delay			
			Video Units			Time Units
			Frames	Lines	Samples	Seconds
525	525	1716	494	524	1716	16.5165
625	625	1728	414	625	1728	16.600

**Table 7-3: Maximum SD Video Delay – 7743DLY-HD**

Video Type	Desired Delay		Video Units		
	Milliseconds	Total Samples	Frames	Lines	Samples
525	50	1,350,000	1	261	1224
	100	2,700,000	2	523	732
	200	5,400,000	5	521	1464
625	50	1,350,000	1	156	432
	100	2,700,000	2	313	239
	200	5,400,000	5	1	478

**Table 7-4: Typical SD Video Delay Settings**

Video Type	Desired Delay		Video Units		
	Milliseconds	Total Samples	Frames	Lines	Samples
1080i/60	50	3,712,500	1	562	1100
	100	7,425,000	3	0	0
	200	14,850,000	6	0	0
1080i/50	50	3,712,500	1	281	660
	100	7,425,000	2	562	1320
	200	14,850,000	5	5	0
1080p/24	50	3,712,500	1	225	0
	100	7,425,000	2	450	0
	200	14,850,000	4	900	0
720p/60	50	3,712,500	3	0	0
	100	7,425,000	6	0	0
	200	14,850,000	12	0	0

Table 7-5: Typical HD Video Delay Settings

## 7.2. CONFIGURING THE VIDEO OUTPUT PHASE

The *Reference Phase* menus are used to the output video timing. The chart below shows the items available in the *Reference Phase* menu. Sections 7.2.1.1 to 7.2.1.2 give detailed information about each of the menu items.

V	Sets the vertical phase of the output signal to the genlock reference input
H	Sets the horizontal phase of the output signal to the genlock reference input

### 7.2.1. Setting up the Video Output Timing

The output stage of the 7740DLY-HD contains a frame buffer and a line buffer so that the output video can be timed with respect to the reference applied to the **GENLOCK** input BNC. In the absence of a genlock signal the output video will be timed with respect to the incoming Video.



**The V and H phase adjustments are REAL TIME ADJUSTMENTS and will affect the output video timing immediately. These settings should not be adjusted when the output video is in the broadcast chain.**

### 7.2.1.1. Setting the Vertical Phase of the Output Video

Reference Phase
V
1 to Max Lines
1

With this control, you can set the vertical timing of the output video with respect to the genlock reference input. There are separate settings of V phase offset for each output video type. Setting this control to 1 keeps the output video in time with the Genlock reference or incoming video if genlock is missing.

Increasing the value will delay the output video in one-line increments of the output video standard. In order to advance the vertical timing of the output video with respect to the genlock video, set the control to the maximum total number of lines of the output video minus the number of lines that you wish to advance the output video. (E.g. for 1080i/59.94 output video the total number of lines is 1125, so to advance the output video 5 lines set the value to 1120.) If increasing the *V Phase Offset* value causes it to go beyond the limit of the frame buffer, the *V Phase Offset* will wrap to the beginning of the frame buffer, resulting in a change of one frame of throughput delay between the video input and the video output.

### 7.2.1.2. Setting the Horizontal Phase of the Output Video

Reference Phase
H
0 to Max samples
0

With this control, you can set the horizontal timing of the output video with respect to the genlock reference input. There are separate settings of V phase offset for each output video type. Setting this control to 0 keeps the output video in time with the Genlock reference.

Increasing the value will delay the output video in one-sample increments. In order to advance the horizontal timing of the output video with respect to the genlock video, set the control to the maximum number of samples per line for the output video standard minus the number of samples that you wish to advance the output video. (E.g. for 1080i/59.94 output video the total number of samples per line is 2200, so to advance the output video 5 samples set the value to 2195.)

## 8. JUMPERS AND USER CONTROLS

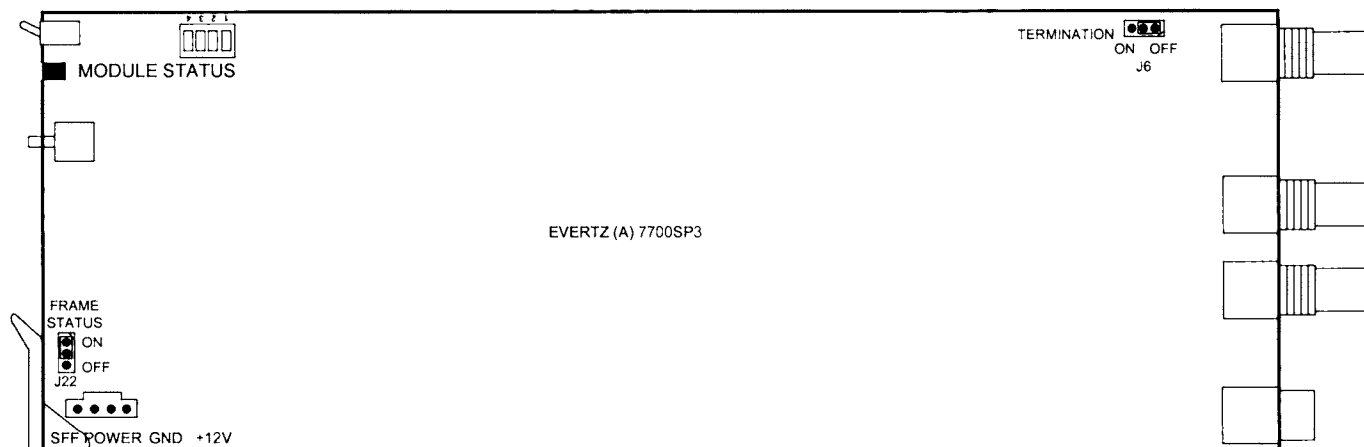


Figure 8-1: Location of Jumpers on Main Boards

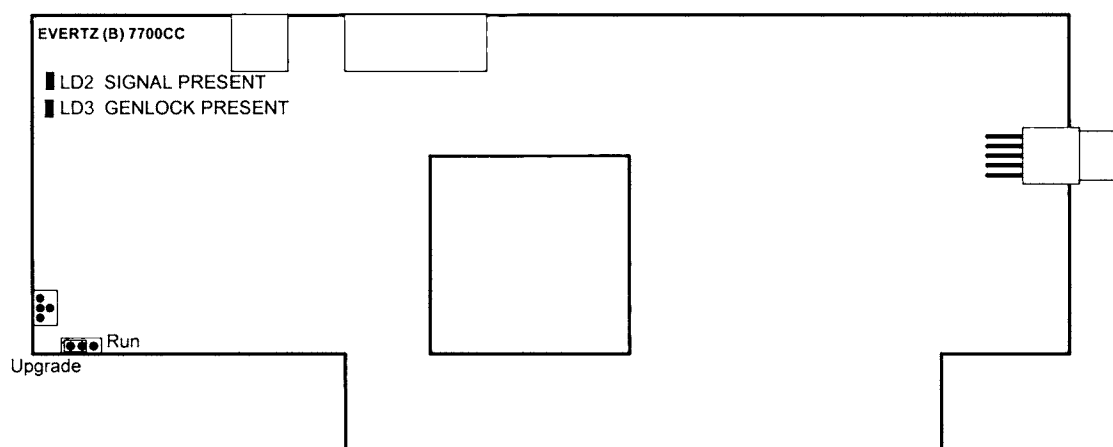


Figure 8-2: Location of Jumpers on 7700CC Sub Module

### 8.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

**FRAME STATUS:** The FRAME STATUS jumper J22 located at the front of the main module determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

To monitor faults on this module with the frame status indicators (on the PS FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position. (Default)

When this jumper is installed in the Off position, local faults on this module will not be monitored.

---

**8.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES**

**UPGRADE:** The UPGRADE jumper J16 located at the front of the main module is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. See the *Upgrading Firmware* chapter in the front of the binder for more information.

To upgrade the firmware in the module unit pull it out of the frame. Move Jumper J16 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J24 at the card edge. Re-install the module into the frame. Run the upgrade as described in *Upgrading Firmware* chapter. Once the upgrade is complete, remove the module from the frame, move J16 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

**8.3. SELECTING WHETHER THE GENLOCK REFERENCE INPUT IS TERMINATED**

**TERM:** The TERM jumper J9 located at the rear of the APB3FMTCON sub-module is used to terminate the genlock loop input. Then it is in the 75R position a 75 ohm terminating resistor will connect the input to ground. When it is in the HI-Z position the genlock loop input will be high impedance.

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## **9. VISTALINK® REMOTE MONITORING/CONTROL**

### **9.1. WHAT IS VISTALINK®?**

VistaLINK® is Evertz's remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. VistaLINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through VistaLINK® PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, VistaLINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz VistaLINK® Pro Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz VistaLINK® enabled fiber optic products.
2. Managed devices (such as 7707MB), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK® frame controller module, which serves as the Agent.
3. A virtual database, known as the Management Information Base (MIB) lists all the variables being monitored, which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the VistaLINK® network, see the 7700FC Frame Controller chapter.

## 9.2. VISTALINK® MONITORED PARAMETERS

The following parameters can be remotely monitored through the VistaLINK® interface.

Parameter	Description
Module Status	Indicates good module health and the presence of a valid video input signal. (The state of the MODULE OK LED)
Input Video Present	Indicates the presence of a valid video input signal. (The state of the VIDEO PRESENT LED)
Input Video Standard	Indicates video standard of input signal
Gen Lock Present	Indicates the presence of a valid genlock reference signal. (The state of the GENLOCK LED)
Local Remote Mode	Indicates whether the 7740DLY-HD is under local control or VistaLINK® control. (The state of DIP switch 4)
Total Delay (frames)	Indicates the frames of the total delay being applied to the video
Total Delay (lines)	Indicates the partial frames of total delay being applied to the video (expressed as lines)
Total Delay (samples)	Indicates the partial lines of total delay being applied to the video (expressed as samples)
Total Delay (time)	Indicates the current delay through line buffer when Genlock signal is applied (expressed as microseconds)

**Table 9-1: VistaLINK® Monitored Parameters**

## 9.3. VISTALINK® CONTROLLED PARAMETERS

Parameter	Description
Gen Lock Standard	Sets video standard of genlock reference signal. When DIP switch 4 is Off indicates the state of DIP switches 1 to 3
V Phase Offset	Vertical phase offset from Genlock reference
H Phase Offset	Horizontal phase offset from Genlock reference
Video Delay (frames)	Whole frames of delay being added to the video
Video Delay (lines)	Whole lines of delay being added to the video
Video Delay (samples)	Partial lines of delay (i.e. samples) being added to the video

**Table 9-2: VistaLINK® Controlled Parameters**



#### **9.4. VISTALINK® TRAPS**

The following traps can be controlled through the *VistaLINK®* interface. Each trap will indicate a fault condition when its value is True.

<b>Trap</b>	<b>Description for True Condition</b>
ModuleStatus	Local Fault LED is On
VideoPresent	No input video present (VIDEO PRESENT LED is Off)
GenlockPresent	No genlock present (GENLOCK PRESENT LED is Off)
InvalidVideoStandard	Input signal has an unsupported Video Standard

**Table 9-3: VistaLINK® Traps**

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## 7700 Multiframe Manual

### Upgrading Firmware in 7700 Modules

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#### REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	Original Version	June 99
1.1	Updated list of available modules Added support for 7700PB2 and 7730DAC boards Revised cable drawing for WA-S76 cable Added procedure for upgrading standalone units	July 00
1.2	Updated list of available modules, specifically 7761AVM-DC and 7765AVM-4	Nov 01

## **1. OVERVIEW**

Some of the 7700 series modules contain firmware that is contained in a FLASH EPROM device. From time to time firmware updates will be provided to add additional features to the unit. The following procedure will allow you to upload new firmware from your computer.

### **1.1. UPDATING THE FIRMWARE IN MODULES BASED ON THE 7700PB, 7700PB2, 7730DAC AND RELATED BOARDS**

Many of the 7700 series modules are based on the 7700PB, 7700PB2 or 7730DAC processing boards. Other boards, not categorized into one of the three types, have similar similar firmware updating procedures. You will find the board number printed on the top front corner of the module base board. At the time of writing these modules are:

<b>Model</b>	<b>Description</b>	<b>Board</b>
7710MD	HD monitoring down converter	7700PB
7720AD	SDI AES Audio De-embedder	7700PB
7720AD-HD	HD AES Audio De-embedder	7700PB
7720AE	SDI AES Audio Embedder	7700PB
7720AE-HD	HD AES Audio Embedder	7700PB
7721DD	SDI Data De-embedder	7700PB
7721DE	SDI Data Embedder	7700PB
7730DAC-HD	HD D to A Converter	7730DAC
7732PFT-HD	HD Progressive Format Translator	7700PB2
7750SRG-HD	HS Slave Reference Generator	7730DAC
7750TG	SD Test Signal Generator	7700PB
7750TG-HD	HD Test Signal Generator	7700PB
7760AVM-A to G	SD Audio/Video Monitor	7700PB2
7760AVM-Lite	SD Monitoring D to A convertor	7700PB2
7761AVM-DC	Dual Channel Composite Analog AVM	7761AVM-DC (use 7700PB2 upgrade procedure)
7765AVM-4/-4A	Audio/Video/Data Monitoring and Quad-split Display	(A)7700SP/Rev B - A7700CC (use 7700PB2 upgrade procedure)

**Table 1: 7700 Series Modules**

The procedure for upgrading the firmware in each of these modules is the same. Through the rest of this section these modules will be referred to generically as the 7700PB module.

You will need the following equipment in order to update the 7700PB Firmware

- PC with available communications port. The communication speed is 57600 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
- "Straight-thru" serial extension cable (DB9 female to DB9 male) or (DB25 female to DB9 male)
- Terminal program that is capable of Xmodem file transfer protocol (such as HyperTerminal).
- New firmware supplied by Evertz (available at the download site on [www.evertz.com](http://www.evertz.com))
- Special upgrade cable supplied with the 7700FR-C frame. This cable is normally in the vinyl pouch at the front of this manual. There are two different types of cables, depending on whether you have a 7700PB Rev 1 (Evertz part # WA-S75) or 7700PB Rev A or later, 7700PB2 or 7730DAC board (Evertz part #WA S76).

## 7700 Multiframe Manual

### Upgrading Firmware in 7700 Modules

#### 1.1.1. Update Procedure 7700PB boards

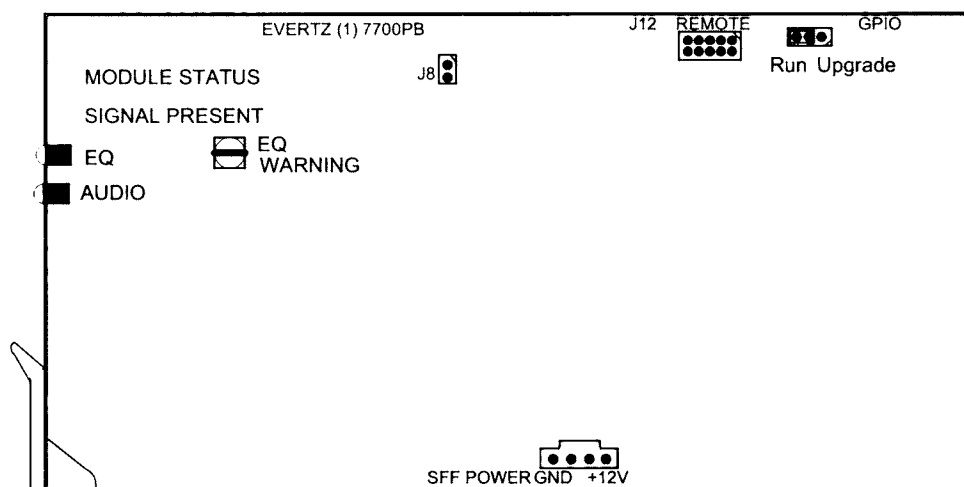
##### 1.1.1.1. PART 1: 7700PB Rev 1 Boards – Configuring the Module for Firmware Upgrades

1. Remove the module from the frame.
2. Connect the 7700PB Rev 1 Serial Upgrade cable to the 2 row x 5 pin header labelled J12 on the top edge of the 7700PB board as shown in Figure 1. The cable has a key installed so that it cannot be installed backwards.

7700 PB End		3 ft. Ribbon Cable	PC End	
2 row X 5 pin Berg	Pin		9 pin D Female	Pin
n/c	1			
Rx	2	-----	Tx	2
Tx	3	-----	Rx	3
n/c	4			
Tx Gnd	5	-----	Gnd	5
n/c	6			
n/c	7			
n/c	8			
n/c	9			
Key	10			

**Table 2: 7700PB Rev 1 Upgrade Cable (WA-S75)**

3. Move the jumper, located on the end of the GPIO header to the UPGRADE position as shown in Figure 1.



**Figure 1 : Location of UPGRADE Jumper on Rev 1 7700PB Boards**

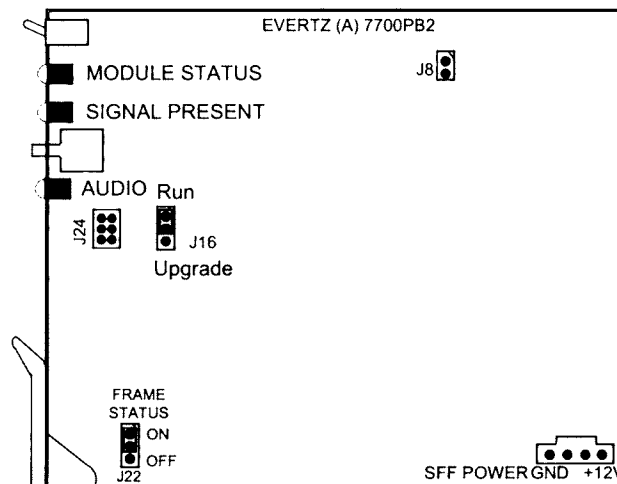
4. Connect the 9 pin connector on the end of the Serial Update cable to the the PCs' RS-232 communications port.
5. Proceed to Part 2 – Terminal program setup.

**1.1.1.2. PART 1: 7700PB Rev A and later, 7700PB2 and 7730DAC Boards – Configuring the Module for Firmware Upgrades**

1. Remove the module from the frame.
2. Connect the 7700PB Serial Upgrade cable to the 2 row x 3 pin header labelled J24 on the front edge of the 7700PB board as shown in Figure 2. Install the cable with the ribbon cable towards the front of the board. (On the 7761AVM-DC, look for the J1 connector. On the 7765AVM-4 “Quattro” look for J14 connector on the lower left, card edge on the Rev B - A7700CC board. See figures 4 and 5 for further details.)

7700 PB End		3 ft. Cable (9501)	PC End	
2 row X 3 pin Berg	Pin		9 pin D Female	Pin
Key	1			1
Rx	2	-----1a-----	Tx	2
Tx	3	-----1b-----	Rx	3
Tx Gnd	4	----drain----	Gnd	5
Key	5			
---	6			

**Table 3: 7700PB Rev A and Later Upgrade Cable (WA-S76)**



**Figure 2 : Location of UPGRADE Jumper on Rev A and later 7700PB and 7700PB2 Boards**

## 7700 Multiframe Manual

### Upgrading Firmware in 7700 Modules

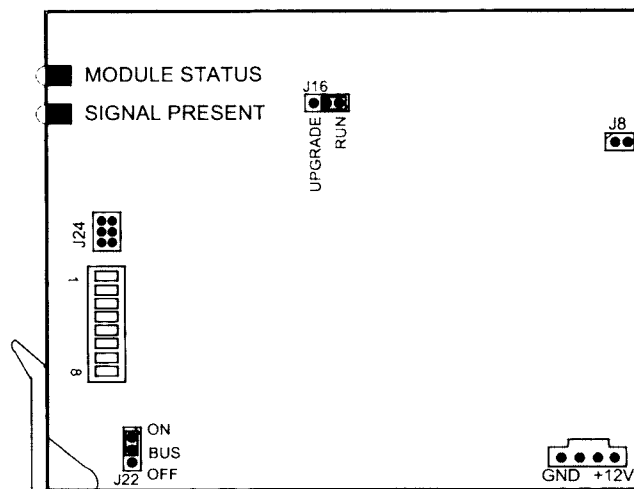


Figure 3 : Location of UPGRADE Jumper on 7730DAC Boards

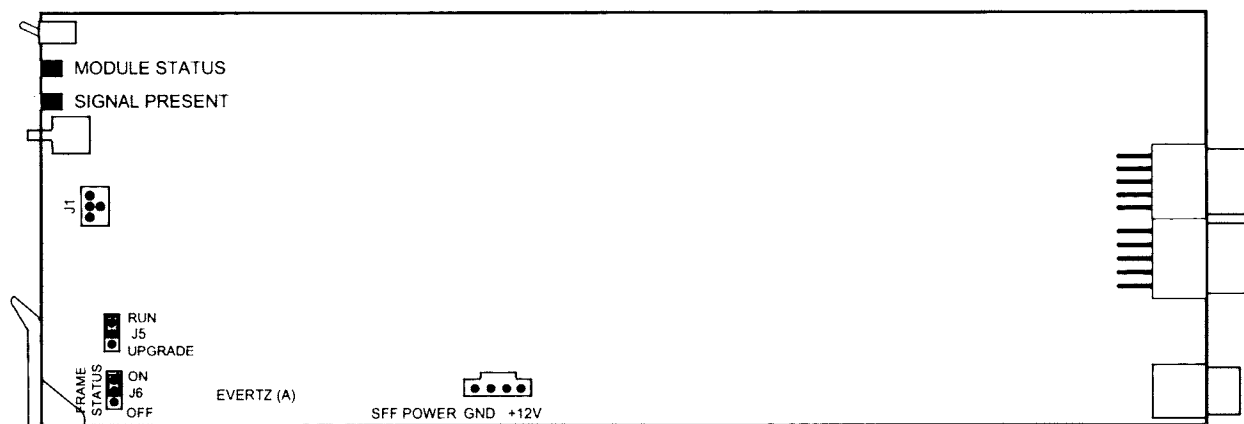


Figure 4 : Location of UPGRADE Jumper on 7761AVM-DC Boards

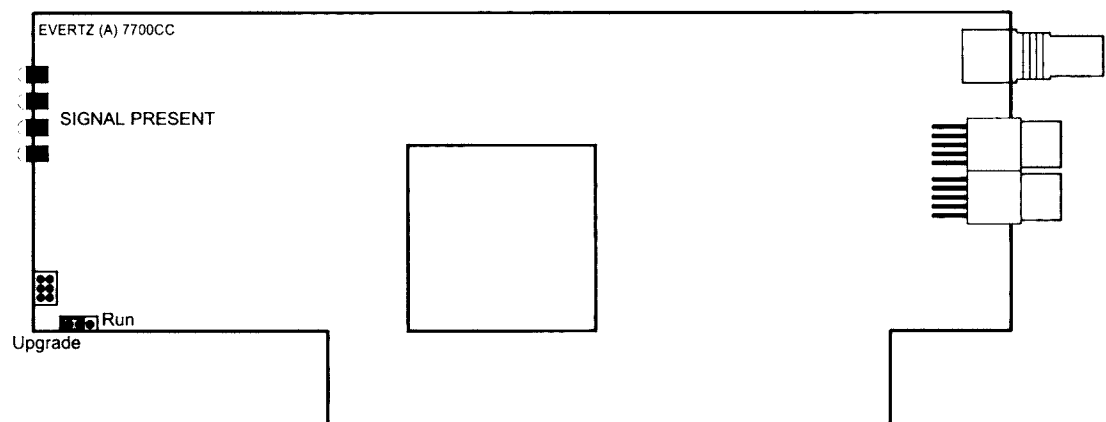


Figure 5 : Location of UPGRADE Jumper on 7765AVM-4 "Quattro" Rev B A7700CC Boards

3. Move jumper J16 to the UPGRADE position as shown in Figure 2. (On the 7761AVM-DC, look for the J5 connector. On the 7765AVM-4 "Quattro" look for J15 connector on the lower left, card edge on the (B)A7700CC board.)
4. Connect the 9 pin connector on the end of the Serial Update cable to the the PCs' RS-232 communications port
5. Proceed to PART 2: Terminal Program Setup

#### **1.1.1.3. PART 2: Terminal Program Setup**

6. Start the terminal program.
7. Configure the port settings of the terminal program as follows:

Baud	<b>57600</b>
Parity	<b>no</b>
Data bits	<b>8</b>
Stop bits	<b>2</b>
Flow Control	<b>None</b>

8. Install the 7700PB module into the frame. After the module powers up, a banner with the boot code version information should appear in the terminal window.

For example:

```
EVERTZ 7700PB MONITOR 1.0
COPYRIGHT 1997, 1998, 1999 EVERTZ MICROSYSTEMS LTD.
```

9. The following is a list of possible reasons for failed communications:
  - Defective 7700PB Serial Upgrade cable.
  - Wrong communications port selected in the terminal program.
  - Improper port settings in the terminal program. (Refer to step 7 for settings).

#### **1.1.1.4. PART 3: Uploading the New Firmware**

10. Upload the "\*.bin" file supplied using the X-Modem transfer protocol of your terminal program. If you do not start the upload within 10 minutes the 7700PB Boot code will time out. You can restart the upgrade process by removing and reinstalling the module.
11. The boot code will indicate whether the operation was successful upon completion of the upload.

For Example:

```
UPLOAD OKAY
7700PB COLD BOOT> |
```



## 7700 Multiframe Manual

### Upgrading Firmware in 7700 Modules

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The cursor to the right of the word "BOOT>" should be spinning for about 5 seconds then the module will reboot.

12. The following is a list of possible reasons for a failed upload:

- If you get the message "transfer cancelled by remote" you must restart the terminal program and load the bin file, then remove and install the module again.
- The supplied "\*.bin" file is corrupt.
- Wrong file specified to be uploaded.
- The PCs' RS-232 communications port can't handle a port speed of 57600.
- Noise induced into the 7700PB Serial Upgrade cable.

#### 1.1.1.5. PART 4: Completing the Upgrade

13. You can now close the terminal program and disconnect the RS-232 serial cable from the PC.

14. Remove the module from the frame and disconnect the 7700PB Serial Upgrade cable from the module. Restore the *UPGRADE* jumper to the RUN position

15. Reinsert the module into the frame.

The update procedure is now completed.

## 1.2. UPDATING THE FIRMWARE IN STANDALONE UNITS BASED ON THE 7700PB, 7700PB2 and 7730DAC BOARDS

Many of the 7700 series standalone units are based on the 7700PB, 7700PB2 or 7730DAC processing boards. These units are fitted with a COM port connector that can be connected to a PC with a straight through cable.

You will need the following equipment in order to update the 7700PB Firmware

- PC with available communications port. The communication speed is 57600 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
- "Straight-thru" serial extension cable (DB9 female to DB9 male) or (DB25 female to DB9 male)
- Terminal program that is capable of Xmodem file transfer protocol. (such as HyperTerminal)
- New firmware supplied by Evertz.

### 1.2.1. Update Procedure 7700PB boards

#### 1.2.1.1. PART 1: Configuring the Unit for Firmware Upgrades

16. Connect the 9 pin male connector on the straight through serial extension cable to the COM port on the rear of the standalone unit. Connect the 9 pin female connector to the the PCs' RS-232 communications port

**1.2.1.2. PART 2: Terminal program Setup**

17. Start the terminal program.

18. Configure the port settings of the terminal program as follows:

Baud	<b>57600</b>
Parity	<b>no</b>
Data bits	<b>8</b>
Stop bits	<b>2</b>
Flow Control	<b>None</b>

19. Apply power to the standalone unit. After the unit powers up, a banner with the boot code version information should appear in the terminal window. The cursor to the right of the word "BOOT>" should be spinning for about 5 seconds then the unit will continue to boot.

For example:

```
EVERTZ 7700PB MONITOR 1.0
COPYRIGHT 1997, 1998, 1999 EVERTZ MICROSYSTEMS LTD.
COLD BOOT |
```

20. The following is a list of possible reasons for failed communications:

- Defective 7700PB Serial Upgrade cable.
  - Wrong communications port selected in the terminal program.
  - Improper port settings in the terminal program. (Refer to step 7 for settings).
6. While the cursor is spinning press the <CTRL> and <X> keys on your computer keyboard at the same time, this should stop the cursor from spinning. The spinning prompt will only remain for about 5 seconds. You must press <CTRL-X> during this 5 second delay. If the unit continues to boot-up, simply cycle the power and repeat this step.
7. Hit the <ENTER> key on your computer once.
8. Type the word "upgrade", without quotes, and hit the <ENTER> key once.
9. The boot code will ask for confirmation. Type "y", without quotes.
10. You should now see a prompt asking you to upload the file.

## 7700 Multiframe Manual

### Upgrading Firmware in 7700 Modules

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#### 1.2.1.3. PART 3: Uploading the new firmware

11. Upload the "\*.bin" file supplied using the X-Modem transfer protocol of your terminal program. If you do not start the upload within 10 minutes the 7700PB Boot code will time out. You can restart the upgrade process by removing and reinstalling the module.
12. The boot code will indicate whether the operation was successful upon completion of the upload.

For Example:

```
UPLOAD OKAY
7700PB COLD BOOT> |
```

13. The following is a list of possible reasons for a failed upload:

- If you get the message "transfer cancelled by remote" you must restart the terminal program and load the bin file, then remove and install the module again.
- The supplied "\*.bin" file is corrupt.
- Wrong file specified to be uploaded.
- The PCs' RS-232 communications port can't handle a port speed of 57600.
- Noise induced into the 7700PB Serial Upgrade cable.

#### 1.2.1.4. PART 4: Completing the Upgrade

14. Type the word "boot", without quotes, and hit the <ENTER> key once or power cycle the unit. The unit should now reboot.
15. You can now close the terminal program and disconnect the RS-232 serial cable from the PC.

The update procedure is now completed.

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**REVISION HISTORY**

<b><u>REVISION</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>DATE</u></b>
0.1	Preliminary version	May 06

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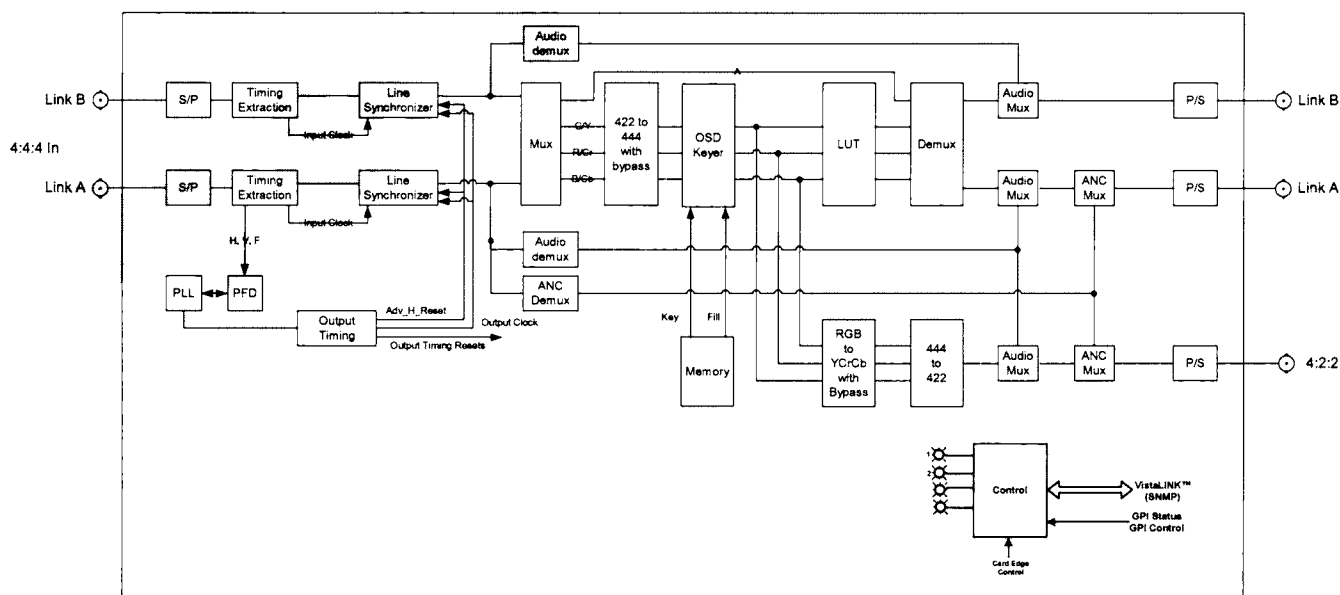
## 1. OVERVIEW

The Evertz 7732DVP-HD Dual Link Video Processor module is a multi-purpose module designed to convert between 4:2:2 and 4:4:4 HDTV video signals in a wide variety of applications. The model 7732DVP-HD can be operated in a dual link to single link mode for emerging 4:4:4 high definition applications, or a 4:2:2 to 4:4:4 mode to convert traditional high definition content to 4:4:4.

The 7732DVP-HD occupies one card slot in the 3 RU frame, which will hold up to 15 modules or the 1RU frame, which will hold up to three modules.

### Features:

- Two serial digital 1.5 Gb/s HD inputs per SMPTE 292M
- Three serial digital 1.5 Gb/s HD inputs per SMPTE 292M
- Supports most international standards including 1080i/60, 1080i/59.94, 1080i/50, 1080p/24sF, 1080p/23.98sF, 1080p/30, 1080p/29.97, 1080p/25, 1080p/24, 1080p/23.98, 720p/60, 720p/59.94, 720p/50
- 4:4:4 Dual Link HDSDI to 4:2:2 HDSDI converter
- 4:2:2 HDSDI to 4:4:4 Dual Link HDSDI converter
- retimed 4:4:4 dual link outputs
- 3:2 pulldown inserter – locked to RP188 time code or 6 Hz pulse
- 6 Hz input
- programmable LUTs for 4:4:4 and 4:2:2 HDSDI
- To accommodate different colorimetry between monitoring devices
- handles logarithmic 'filmstream' inputs from VIPER camera – load through serial port
- store/recall user presets of common configurations – up to 10 presets
- GPI control inputs to select operating modes or load user presets.
- Card edge menu using OSD on 4:2:2 output to configure the operating modes
- Card Edge LEDs for signal presence, module status



**Figure 1: 7732DVP-HD Block Diagram**

## 2. INSTALLATION

The 7732DVP-HD comes with a companion rear plate that occupies one slot in the frame. For information on inserting the module into the frame see the 7700FR chapter section 3.

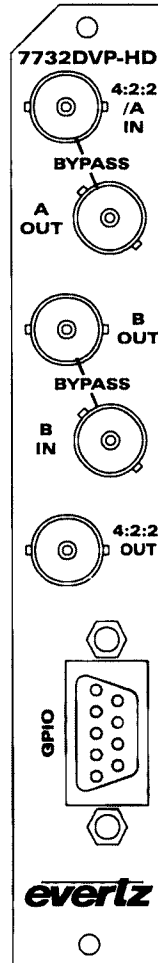


Figure 2: 7732DVP-HD Rear IO Module

### 2.1. HDSOI VIDEO INPUTS AND OUTPUTS

**4:2:2/A IN, B IN** When operating the 7732DVP-HD in the 4:4:4 to 4:2:2 mode, these two BNC connectors are for connecting dual link 10-bit serial digital video input signals, compatible with the SMPTE 372M standard. When operating the 7732DVP-HD in the 4:2:2 to 4:4:4 mode connect the 4:2:2 input video compatible with the SMPTE 292M standard to the **4:2:2/A IN** BNC.

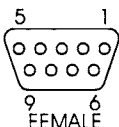
**4:2:2/A OUT, B OUT** When operating the 7732DVP-HD in the 4:4:4 to 4:2:2 mode, these two BNC connectors provide a reclocked and retimes output from the **4:2:2/A IN** and **B IN** input video. When operating the 7732DVP-HD in the 4:2:2 to 4:4:4 mode, the dual link Video output will be available on these two output BNCs.



**4:2:2 OUT** When operating the 7732DVP-HD in the 4:4:4 to 4:2:2 mode, this BNC contains a down sampled 4:2:2 copy of the dual link input video. When operating the 7732DVP-HD in the 4:2:2 to 4:4:4 mode, this BNC contains a reclocked copy of the **4:2:2/A IN** input video.

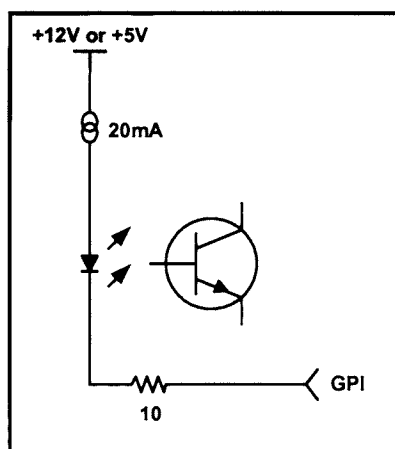
## 2.2. GENERAL PURPOSE INPUTS & OUTPUTS

Table 1 shows the pinout of the 9 pin Female D GPI connector. The 9 pin D connector has 6 general purpose inputs. The GPI inputs are active low. This means that if you leave an input floating (not connected) then it will not be activated. Lowering the GPI input to a voltage below 0.8 volts will activate the input. The user can activate GPIs simply by connecting the GPI input pins to Ground using a button, switch, relay or an open collector transistor. The inputs are internally pulled up to either +5 or +12 volts DC set by jumper J16. The *GPI* menu items on the *UTILITY* menu are used to configure the operation of the GPI inputs. (See section 6.4.3)

	Pin #	Name	Description
	1	GPI6	General Purpose Input 6
	2	GPI2	General Purpose Input 2
	3	GND	Signal Ground
	4	GPI1	General Purpose Input 1
	5	GP02	General Purpose Output 2
	6	GPI3	General Purpose Input 3
	7	GPI4	General Purpose Input 4
	8	GPI5	General Purpose Input 5
	9	GP01	General Purpose Output 1
	Shell	GND	Frame Ground

**Table 1: GPIO Connector Pinouts**

Figure 3 shows the input circuit for the General Purpose inputs.



**Figure 3: Typical GPI Input Circuitry.**

### 3. SPECIFICATIONS

#### 3.1. SERIAL VIDEO INPUT

**Standard:** SMPTE 372M (dual Link 1.5 Gb/s) or SMPTE 292M (1.5 Gb/s) – auto-detects standard  
SMPTE 274M, SMPTE 296M – 1080i/60, 1080i/59.94, 1080i/50, 1080p/24sF, 1080p/23.98sF, 1080p/30, 1080p/29.97, 1080p/25, 1080p/24, 1080p/23.98, 720p/60, 720p/59.94, 720p/50

**Connector:** 2 BNC per IEC 60169-8 Amendment 2.

**Input Equalization:** Automatic to 65m @ 1.5Gb/s with Belden 1694 or equivalent cable.

**Return Loss:** >12 dB up to 1.5GHz

#### 3.2. SERIAL VIDEO OUTPUTS

**Standard:** Same as input

**Number of Outputs:** 2 dual link outputs, 1 single link output

**Connector:** BNC per IEC 60169-8 Amendment 2

**Signal Level:** 800mV nominal

**DC Offset:** 0V  $\pm$ 0.5V

**Rise and Fall Time:** 200ps nominal for HD

**Overshoot:** <10% of amplitude

**Return Loss:** > 10 dB at 1.5 Gb/s (4:4:4 outputs)  
> -6 dB at 1.5 Gb/s (4:2:2 output)

**Jitter:** < 0.16UI

#### 3.3. GPIO CONTROL PORT

**Number of Inputs:** 6

**Number of Outputs:** 2

**Type:** Opto-isolated, active low with internal pull-ups to +5 or +12V (jumper settable)

**Connector:** 9 pin female D

**Signal Level:** closure to ground

#### 3.4. INPUT TO OUTPUT PROCESSING DELAY (HD INPUT VIDEO)

**Video Delay:** 2 lines.

#### 3.5. ELECTRICAL

**Voltage:** +12VDC

**Power:** 10 Watts.

**EMI/RFI:** Complies with FCC regulations for class A devices.  
Complies with EU EMC directive.

#### 3.6. PHYSICAL

**Number of slots:** 1

## **4. STATUS INDICATORS**

The 7700DVP-HD has 10 LED Status indicators on the main circuit board front card edge to show operational status of the card at a glance. Figure 4 shows the location of the LEDs and card edge controls.

Two large LEDs on the front of the board indicate the general health of the module

**LOCAL FAULT:** This Red LED indicates poor module health and will be On during the absence of a valid input signal or if a local input power fault exists (i.e.: a blown fuse). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

**MODULE OK:** This Green LED indicates good module health. It will be On when a valid input signal is present, and board power is good.

There are two small LEDs on the top side of the board (beside the DIP switch) that indicate that the 7732DVP-HD video inputs are present. The input signal must match the video standard setting for these LEDs to be on.

**LINKA/4:2:2 PRESENT:** This Green LED will be On when there is a valid signal present on module 4:2:2/Link A input.

**LINK B PRESENT:** This Green LED will be On when there is a valid signal present on module Link B input.

There are two small LEDs on the bottom side of the board.

**LINKA/4:2:2 LOCKED:** This Green LED will be On when the HDSDI input circuitry has locked to a valid signal present on module 4:2:2/Link A input.

**LINK B LOCKED:** This Green LED will be On when the HDSDI input circuitry has locked to a valid signal present on module Link B input.

#### 4.1. AUDIO STATUS LEDs

Four LEDs located on the lower edge of the module (near the card extractor) indicate which audio groups are present in the input video. Audio group LED 1 is located closest to the center of the module.

Audio LED	Colour	Audio Group Status
1	Off	Neither group 1 nor group 2 present on input 1 video.
	Flashing	Only group 1 or group 2 present on input 1 video.
	Green	Both group 1 and group 2 present on input 1 video.
2	Off	Neither group 3 nor group 4 present on input 1 video.
	Flashing	Only group 3 or group 4 present on input 1 video.
	Green	Both group 3 and group 4 present on input 1 video.
3	Off	Neither group 1 nor group 2 present on input 2 video.
	Flashing	Only group 1 or group 2 present on input 2 video.
	Green	Both group 1 and group 2 present on input 2 video.
4	Off	Neither group 3 nor group 4 present on input 2 video.
	Flashing	Only group 3 or group 4 present on input 2 video.
	Green	Both group 3 and group 4 present on input 2 video.

**Table 2: Audio Group Status LEDs**

#### 5. CARD EDGE CONTROLS

The 7732DVP-HD is equipped with an 8 position DIP switch, toggle switch, and a push button to allow the user to select various functions. All card functions are available through a menu system controlled by the toggle switch and push button and displayed on the On Screen character display (OSD). (See section 6.)

DIP switch 1 is located at the top of the DIP switch (farthest from to the card ejector). Table 3 gives an overview of the DIP switch functions.



**There are two types of DIP switches possible. For slide switches the On (closed) position is farthest from the front edge of the printed circuit board. For 'piano key' switches the On (closed) position is down or closest to the printed circuit board.**

DIP Switch	Function
1	Reserved – set to Off
2	
3	
4	
5	
6	
7	
8	VistaLINK® or Local control Selection (future)

**Table 3: DIP Switch Functions**

## 5.1. SELECTING WHETHER MODULE WILL BE CONTROLLED FROM THE LOCAL CONTROLS OR THROUGH THE VistaLINK® INTERFACE (NOT IMPLEMENTED AT TIME OF WRITING)

The 7732DVP-HD can be controlled using the card edge DIP switches and menu system or remotely via SNMP using VistaLINK® PRO. See section 9 for a full description of the parameters that can be monitored or controlled using VistaLINK®. VistaLINK® control is only available when the card is installed in the 3RU 7700FR-C frame and a 7700FC VistaLINK® Frame Controller card is installed in slot 1 of the frame.

DIP switch 8 is used to enable or disable VistaLINK® control.

DIP 8	CONTROL MODE
Off	Local control mode. The module will be controlled using the menu system
On	VistaLINK® control mode. The module will be controlled remotely through SNMP. Or using the menu system

**Table 4: VistaLINK® Mode Switch Settings**

## 6. CARD EDGE MENUS

A toggle switch and pushbutton allow card edge navigation of a set of on-screen menus used to configure the card. To enter the on-screen menu system, press the pushbutton. This will bring you to the main Setup menu where you can use the toggle switch to move up and down the list of available sub menus. An arrow (➔) moves up and down the left hand side of the menu items to indicate which item you are currently choosing. Once the arrow is on the desired item, press the pushbutton to select the next menu level.

On all menus, there are two extra selectable items: *Back* and *Exit*. Selecting *Back* will take you to the previous menu (the one that was used to get into the current menu) while *Exit* will return the display to its normal operating mode. On the main menu, BACK and EXIT will both take you to the normal operating mode.

Once in a sub menu, there may be another menu layer, or there may be a list of parameters to adjust. If there is another set of menu choices, use the toggle switch to select the desired menu item and press the pushbutton.

To adjust any parameter, use the toggle switch to move up or down to the desired parameter and press the pushbutton. The arrow will move to the right hand side of the line (➡) indicating that you can now adjust the parameter. Using the toggle switch, adjust the parameter to its desired value. If the parameter is a numerical value, the number will increase if you lift the toggle switch and decrease if you push down on the toggle switch.

When you have stopped at the desired value, depress the pushbutton. This will update the parameter to the selected value and move the arrow back to the left side of the parameter list (➔). Continue selecting and adjusting other parameters or use the BACK or EXIT commands.

## 6.1. TOP LEVEL MENU STRUCTURE

The OSD menu is arranged in a layered structure that groups similar configuration items together. The following section gives a brief description of the first level of menus that appear when you enter the OSD screens. Selecting one of these items will take you to the next menu level. Sections 6.2 to 6.4 provide detailed descriptions of each of the sub menus. The tables in sections 6.2 to 6.4 are arranged in an indented structure to indicate the path taken to reach the control. Menu items or parameters that are underlined indicate the factory default values.

VIDEO	Configures Video setup items
LOOK UP TABLES	Configures the Look Up table to be applied to the output video
UTILITY	Configures miscellaneous setup items

## 6.2. CONFIGURING THE VIDEO CONTROLS

The *VIDEO* menus are used to configure parameters associated with the video input and output functions and the Source ID decoders. The chart below shows the items available in the *VIDEO* menu. Sections 6.2.1 to **Error! Reference source not found.** give detailed information about each of the menu items.

<i>Input Type</i>	Selects whether the input is single link to dual link
<i>Video standard</i>	Selects the input video standard
<i>Colour Space</i>	Selects the the colour space of the dual link 4:4:4 video
<i>Loss of video</i>	Selects the action to take when the input video is missing

### 6.2.1. Selects the Action to Take when Input Video Is Missing.

VIDEO	This control is used to determine select whether the 7732DVP-HD has a 4:4:4 Dual link video input or a 4:2:2 single link input.  When set to <i>Auto</i> , the module will convert single link to dual link when there is only an input on the 4:2:2/A input. The module will convert dual link to single link when there is a valid dual link input on both Link A and Link B inputs.  When set to <i>Single Link</i> , the module will convert single link to dual link. 4:2:2 out is copy of 4:2:2/A in.  When set to <i>Dual Link</i> , the module will convert dual link to single link. Link A and Link B outpus are copies of Link A and Link B inputs with LUT applied
Input Type	
Auto	
Single Link	
Dual Link	

**6.2.2. Setting the Video Standard**

VIDEO
Video standard
Auto
1080i/60
1080i/59.94
1080i/50
1080p/24sF
1080p/23.98sF
1080p/30
1080p/29.97
1080p/25
1080p/24
1080p/23.98
720p/60
720p/59.94
720p/50

This control is used to set the video standard for the card. If set to *Auto* mode, the card will adjust operation as needed for the incoming standard.

### 6.2.3. Selects the Colour Space of the 4:4:4 Dual Link Video

VIDEO
Colour Space
YCbCr
RGB
FSRGB

When the *Input Type* menu item is set to *Dual Link* this control should be set to the colour space of the input 4:4:4 video.

Select *YCbCr* when the incoming video is in the 10 bit 4:4:4 YCbCr format. In the *YCbCr* mode, the RGB to YCbCr colour transformation for the 4:2:2 output will be disabled.

Select *RGB* when the incoming video is in the 10 bit 4:4:4 RGB format compliant with SMPTE 274M or SMPTE 296M. The RGB video has the three components scaled such that the extreme values are code words 040<sub>h</sub> (64) and 3AC<sub>h</sub> (940) in a 10-bit representation. In the *RGB* mode, the RGB to YCbCr colour transformation for the 4:2:2 output will be enabled.

Select *FSRGB* when the incoming video is in the extended range 10 bit 4:4:4 FSRGB format. The FSRGB video has its three components scaled such that the extreme values are code words 04<sub>h</sub> (4) and 3FB<sub>h</sub> (1019) in a 10-bit representation. In the *FSRGB* mode, the FSRGB to YCbCr colour transformation for the 4:2:2 MON output will be enabled, and the YCrCb 4:2:2 output video components will be scaled such that the extreme values are code words 040<sub>h</sub> (64) and 3AC<sub>h</sub> (940) in a 10-bit representation.

When the *Input Type* menu item is set to *Single Link* this control determines the colour space of the output 4:4:4 video.

Select *YCbCr* when the dual link output video should be in the 10 bit 4:4:4 YCbCr format. In the *YCbCr* mode, the YCbCr to RGB colour transformation for the 4:2:2 input will be disabled.

Select *RGB* when the dual link output video should be in the 10 bit 4:4:4 RGB format compliant with SMPTE 274M or SMPTE 296M. The 4:4:4 RGB output video will have its three components scaled such that the extreme values are code words 040<sub>h</sub> (64) and 3AC<sub>h</sub> (940) in a 10-bit representation. In the *RGB* mode, the YCbCr to RGB colour transformation for the 4:2:2 input will be enabled.

Select *FSRGB* when the dual link output video should be in the extended range 10 bit 4:4:4 FSRGB format. The 4:4:4 FSRGB output video will have its three components scaled such that the extreme values are code words 04<sub>h</sub> (4) and 3FB<sub>h</sub> (1019) in a 10-bit representation. In the *FSRGB* mode, the YCbCr to RGB colour transformation for the 4:2:2 input will be enabled,



#### 6.2.4. Selects the Action to Take when Input Video Is Missing.

VIDEO
Loss of video
Blue
Black
Pass

This control is used to determine what action to take when the video input is missing. The user can either have the output video go to black or blue or pass whatever data is at the input.

### 6.3. CONFIGURING THE LOOK UP TABLES

The *LOOK UP TABLES* menus are used to configure the look up table that will be applied to the output video. It is also used to load user look up tables to the 7732DVP-HD memory. The chart below shows the items available in the *LOOK UP TABLES* menu. Sections 6.2.1 to **Error! Reference source not found.** give detailed information about each of the menu items.

Active Lookup
Upload User LUT

Selects the active look up table

Initates a nuplad to one of the User Look up Table memories

#### 6.3.1. Controlling whether the Look Up Table is Loaded

LOOK UP TABLES
Active Lookup
1:1
Kill R
Kill G
Kill B
FilmStream
User 1
User 2
User 3
User 4
User 5

This control is used to select the currently active look up table from one of the factory LUTs or one of the five user lookup table memories.

The *1:1* LUT effectively turns off the look up table function

The *Kill R* LUT removes all the Red

The *Kill G* Look Up table which removes all the Green

The *Kill B* Look Up table which removes all the Blue

The *Filmstream* LUT restores a Filmsteam encoded video to a linear space

Loads the *User 1* LUT

Loads the *User 2* LUT

Loads the *User 3* LUT

Loads the *User 4* LUT

Loads the *User 5* LUT

### 6.3.2. Uploading User Lookup Tables

#### LOOK UP TABLES

##### Upload User LUT

Cancel

User 1

User 2

User 3

User 4

User 5

This control is used to initiate an upload to one of the user look up table memories.

Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J24 near the card ejector. Connect the 9 pin D connector to a PC running Hyperterminal or some other terminal software.

After selecting the *Upload User LUT* menu, you must select the user look up table memory you want to upload to and press the pushbutton before the upload can take place. After pressing the pushbutton use the terminal software to send the LUT as a text file to the 7732DVP-HD. See section xx for more information about Look up tables.

You can abort the upload operation by pressing the pushbutton when *Cancel* is displayed.



**The Upload baud rate for the 7732DVP-HD modules is 115,200 baud, even parity 1 stop bit.**

## 6.4. UTILITIES

The *UTILITY* menus are used to list the module firmware version, upgrade the firmware, and manage the user presets. The chart below shows the items available in the *UTILITY* menu. Sections 6.4.1 to 6.4.8 give detailed information about each of the parameters.

<i>Recall Preset</i>	Allows user to recall configurations from a user preset.
<i>Store Preset</i>	Allows user to store the current configuration of the card to a user preset.
<i>GPI 1</i>	Allows user to select the function of GPI input 1.
<i>GPI 2</i>	Allows user to select the function of GPI input 2.
<i>GPI 3</i>	Allows user to select the function of GPI input 3.
<i>GPI 4</i>	Allows user to select the function of GPI input 4.
<i>GPI 5</i>	Allows user to select the function of GPI input 5.
<i>GPI 6</i>	Allows user to select the function of GPI input 6.
<i>GPO 1</i>	Allows user to select the function of GPO output 1.
<i>GPO 2</i>	Allows user to select the function of GPO output 2.
<i>Status Window</i>	Allows user to turn the Status window OSD on and off.
<i>Upgrade</i>	Used to upgrade the firmware in the module.
<i>Factory Reset</i>	Perform a reset of the module to factory defaults
<i>About...</i>	Shows the firmware version of the module.

### 6.4.1. Recalling Card Configurations from the User Presets

<b>UTILITY</b>	This control is used to restore the current card configuration from one of the saved user presets
<i>Recall preset</i>	
<i>Cancel</i>	After selecting the recall preset operation, you must select the preset number you want to recall and press the pushbutton before the recall will take place. You can abort the operation by pressing the pushbutton when <i>Cancel</i> is displayed.
<i>Preset 1</i>	
<i>Preset 2</i>	
<i>...</i>	
<i>Preset 10</i>	

#### 6.4.2. Storing Card Configurations to the User Presets

<b>UTILITY</b>
<u>Store preset</u>
<u>Cancel</u>
Preset 1
Preset 2
...
Preset 10

This control is used to store the current card configuration into one of the saved user presets

After selecting the store preset operation, you must select the preset number you want to use to save the card configuration and press the pushbutton before the store will take place. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

#### 6.4.3. Selecting the function of the GPI inputs

There are six menu items that are used to program the functions of the GPI inputs. For the sake of simplicity only the menu item for GPI1 will be described in the manual.

<b>UTILITY</b>
<u>GPI 1</u>
<u>Off</u>
Preset 1
Preset 2
...
Preset 10
1:1 LUT
Kill R LUT
Kill G LUT
Kill B LUT
FilmStream LUT
User 1 LUT
User 2 LUT
User 3 LUT
User 4 LUT
User 5 LUT
6 Hz Input
OSD Disable
Status Enable

This control is used to select the function of GPI input 1.

Turns off the GPI.  
Recalls Preset 1  
Recalls Preset 2  
...  
Recalls Preset 10  
Loads the 1:1 Look Up Table  
Loads the *Kill R* Look Up Table  
Loads the *Kill G* Look Up Table  
Loads the *Kill B* Look Up Table  
Loads the *Filmstream* Look Up Table  
Loads the *User 1* Look Up Table  
Loads the *User 2* Look Up Table  
Loads the *User 3* Look Up Table  
Loads the *User 4* Look Up Table  
Loads the *User 5* Look Up Table  
Used the GPI input as a 6 Hz input for 3:2 pulldown control (future)  
Disables the On Screen Display on the 4:2:2 Out  
Turns the Status Window on or Off

#### 6.4.4. Selecting the function of the GPO Outputs

There are two menu items that are used to program the functions of the GPO outputs. For the sake of simplicity only the menu item for GPO1 will be described in the manual.

<b>UTILITY</b>
<u>Gpo 1</u>
<u>4:2:2 Input Tally</u>
4:4:4 Input Tally

This control is used to select the function of GPO output 1.

Tally when 4:2:2 video present and *Input Type menu* set to *Single Link*  
Tally when 4:4:4 video present and *Input Type menu* set to *Dual Link*

#### 6.4.5. Enabling the Status Window

<b>UTILITY</b>
Status Window
Off
On
GPI

This control is used to turn the status window on or off. The Status window shows the card status at a glance and is visible on the **4:2:2 OUT** video output.

When set to *On* the status window will always be On.  
When set to *GPI* the status window can be controlled by one of the GPIs. See section 6.4.3 for information about programming the GPI functions.

The Status window will show the following items on the 4:2:2 Out when it is enabled.

Item	Value	Example
Input Type:	{input type detected   selected}	4:4:4
Link A:	present   missing	present
Link B:	present   missing	present
Video Standard:	{video standard detected   selected}	Auto: 1080p/23.98sF
Colour Space:	YCrCb   RGB   XYZ & GAMMA DETECT	RGB - Gamma out of range
2:3 Pulldown:	not applicable   active   disabled	active
Pulldown Reference:	not applicable   RP188   6 Hz   Auto	Auto: RP188
Active Lookup Table:	[List of LUTs]	User 1
GPI 1:	[List of functions] : active   inactive	Load Preset 1 : Inactive
GPI 2:	[List of functions] : active   inactive	Load Preset 2 : Inactive
GPI 3:	[List of functions] : active   inactive	Load Preset 3 : Inactive
GPI 4:	[List of functions] : active   inactive	Load Preset 4 : Inactive
GPI 5:	[List of functions] : active   inactive	Load Preset 5 : Inactive
GPI 6:	[List of functions] : active   inactive	6 Hz : active
GPO1:	[List of functions] : active   inactive	4:2:2 Tally : Active
GPO2:	[List of functions] : active   inactive	4:4:4 Tally : Active
Control Mode:	Local   Local & Vistalink	Local Control

**Table 5: Status Display**

#### 6.4.6. Initiating a Software Upgrade

UTILITY
Upgrade
Cancel
Yes

This control is used to initiate an upgrade of the module software.

In addition to the software upgrade support detailed in the *Upgrading Firmware* chapter in the front of the binder, you can initiate an upgrade with this control. This will allow you to upgrade the software without unplugging the card and changing the upgrade jumper.

After selecting the upgrade operation, you must change the command to Yes and press the pushbutton before the upgrade can take place. Follow the remainder of the instructions in the *Upgrading Firmware* chapter. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

After the upgrade has finished, the unit will automatically restart and run in normal operating mode.



**The Upgrade baud rate for the 7732DVP-HD modules is 115,200 baud.**

#### 6.4.7. Restoring the Module to its Factory Default Configuration

UTILITY
Factory reset
Cancel
Yes

This menu item is used to restore all controls back to their factory defaults.

After selecting the reset operation, you must change the command to Yes and press the pushbutton before the command takes place. After the command, all parameters will be set to their factory default. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

#### 6.4.8. Accessing Information About this Module and its Firmware

UTILITY
About...

This control lists the particulars about this module and the firmware residing within it. It gives quick access to information about revisions that can be used to determine when upgrades are required.

## 7. LOCATION OF LEDS AND JUMPERS

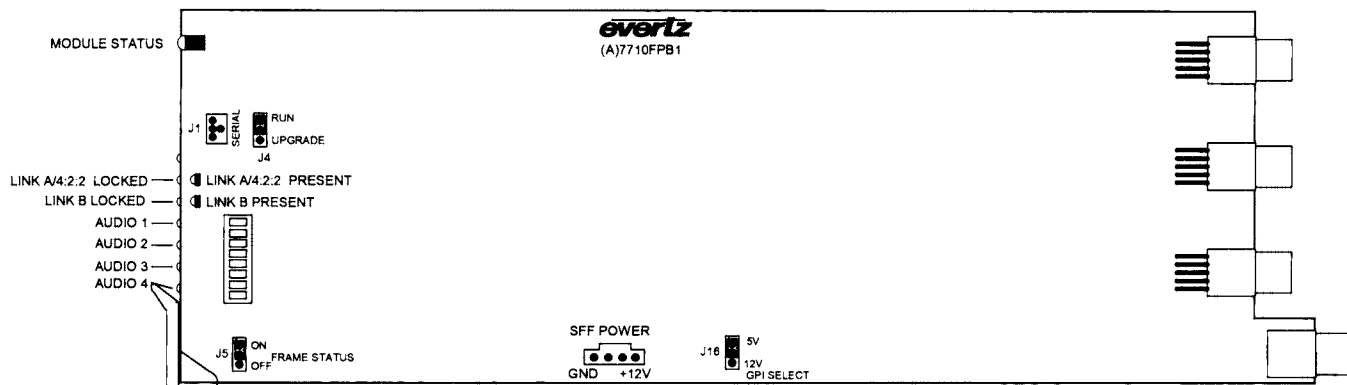


Figure 4: LED and Jumper Locations

### 7.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper J5, located at the front of the module determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

**FRAME STATUS:** To monitor faults on this module with the frame status indicators (on the power supply's FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position.

When this jumper is installed in the Off position local faults on this module will not be monitored.

### 7.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

**UPGRADE** The UPGRADE jumper J4 located at the front edge of the module, near the serial port header, is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. See the *Upgrading Firmware* section in the front of the binder for more information.

To upgrade the firmware in the module pull it out of the frame. Move Jumper J4 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J24 near the card ejector. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* section in the front of the binder. Once the upgrade is completed, remove the module from the frame, move J4 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.



Note that the baud rate for firmware upgrades is 115200 baud

7.3. CONTROLLING GPI PULLUP VOLTAGE

Jumper J16, located at the rear of the module controls whether the GPI inputs and outputs are pulled up to 5 volts or 12 volts.

**GPI SELECT:** To pull the GPI inputs and outputs up to 12 volts install this jumper in the position closest to edge of the module.

To pull the GPI inputs and outputs up to 5 volts install this jumper in the position closest to centre of the module.

8. MENU QUICK REFERENCE

**VIDEO**

- Input Type
- Video standard
- Colour Space
- Loss of video

**LOOK UP TABLES**

- Active Lookup
- Upload User LUT

**Utilities**

- Recall Preset
- Store Preset
- GPI 1
- GPI 2
- GPI 3
- GPI 4
- GPI 5
- GPI 6
- GPO 1
- GPO 2
- Status Window
- Upgrade
- Factory Reset
- About...





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## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	Original Version	June 99
1.1	Added drawings to show location of jumpers	Aug 99
1.2	Added section on adjusting the EQ threshold, Bypass mode now called non-reclock mode, Figures 1,3,4 updated	Sept 99
1.3	Added information on 7700DA8-HD 8 output DA, Added jumper locations for Rev C board (Figure 5 added) Specifications updated	July 00

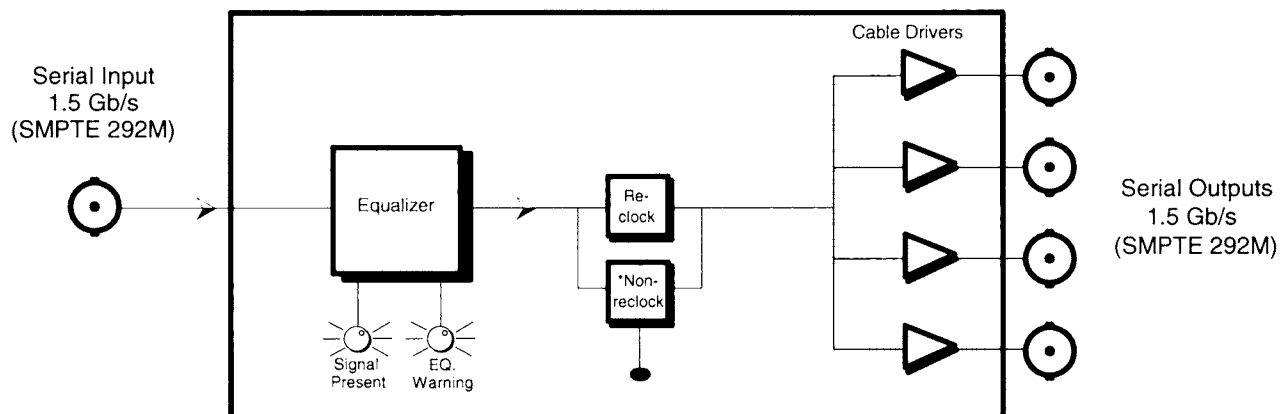
## 1. OVERVIEW

The 7700DA-HD Distribution Amplifier provides an economical method of distribution for your SMPTE 292M (1.5 Gb/s) HDTV serial digital signals. The 7700DA-HD has been designed to be used primarily as a reclocking 1.5Gb/s distribution amplifier, however, it can also be used as a non-reclocking SMPTE 292M, SMPTE 310M (19.4 Mb/s, or 45 Mb/s), DVB-ASI, or SMPTE 259M(143 to 540 Mb/s) distribution product. The DA's come in two versions.

Model	Total Outputs	DVB-ASI Compatible Outputs	Slots
7700DA-HD	4	4	1
7700DA8-HD	8	6	2

### Features:

- Reclocking mode for SMPTE 292M (1.5 Gb/s) signals
- Non-reclock mode for SMPTE 292M, SMPTE 310M (nominal 19.4 Mb/s), SMPTE 259M (143 to 540 Mb/s) or DVB-ASI, or any other bit rate less than 1.5 Gb/s
- Fully hot-swappable from front of frame with no BNC disconnect required
- Polarity maintained from input to output for DVB-ASI applications (only outputs 1,2,3,4,5 and 7 on 7700DA8-HD)
- Automatic cable equalization to 130 m
- Tally output on Frame Status bus upon loss of input signal



\*Note: Non-reclock Mode will operate 19.4 Mb/s to 1.5 Gb/s.

**Figure 1: 7700DA-HD Block Diagram**

## 2. INSTALLATION

The 7700DA-HD comes with a companion rear plate that has 5 BNC connectors. The 7700A10-HD comes with a companion rear plate that has 9 BNC connectors and occupies two slots in the frame. For information on mounting the rear plate and inserting the module into the frame see the 7700FR chapter section 3.

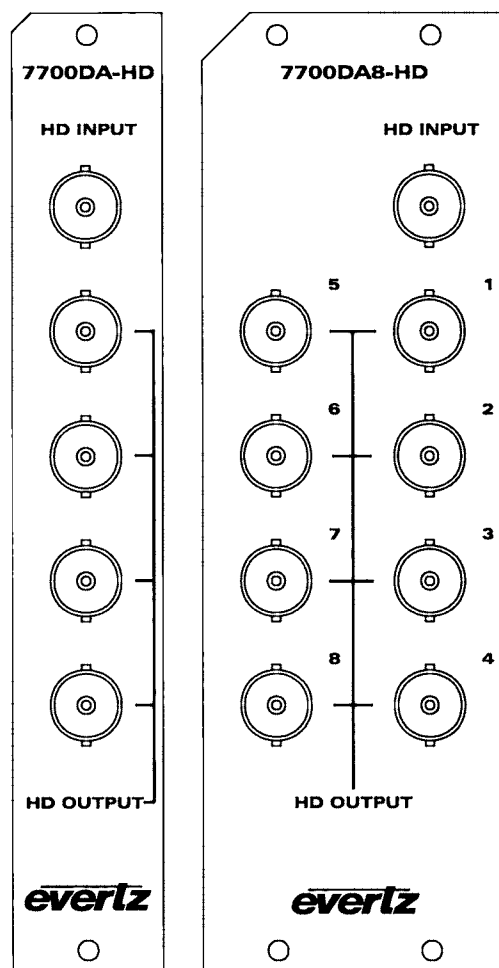


Figure 2: Rear Panels

**HD INPUT** Input BNC connector for 10-bit serial digital video signals compatible with the SMPTE 292M standard.

**HD OUTPUT** 7700DA-HD: There are four BNC connectors with reclocked serial component video outputs, compatible with the SMPTE 292M standard. All outputs maintain the same polarity as the input and are DVB-ASI compliant in non-reclock mode.

7700DA8-HD: There are eight BNC connectors with reclocked serial component video outputs, compatible with the SMPTE 292M standard. Outputs 1, 2, 3, 4, 5 and 7 maintain the same polarity as the input and are DVB-ASI compliant in non-reclock mode.

### 3. SPECIFICATIONS

#### 3.1. SERIAL VIDEO INPUT:

**Standards:**

Normal: SMPTE 292M

Non-Reclock Mode: SMPTE 292M, SMPTE 310M (MPEGTX 19.4 & 40Mb/s) or  
SMPTE 259M A, B, C, D,  
DVB-ASI or any other bit rate less than 1.5 Gb/s

**Connector:** 1 BNC per IEC 169-8

**Equalization:** Automatic 130m @ 1.5Gb/s with Belden 1694 or equivalent cable

**Return Loss:** > 15 dB up to 1 Gb/s, > 12 dB up to 1.5 Gb/s

#### 3.2. SERIAL VIDEO OUTPUTS:

**Number of Outputs:** 4 Per Card. (7700DA-HD, all outputs 1, 2, 3, 4, 5 and 7 are DVB-ASI compliant  
8 per card (7700DA8-HD) outputs 1, 2, 3, 4, 5 and 7 are DVB-ASI compliant

**Standards:** same as input

**Connectors:** BNC per IEC 169-8

**Signal Level:** 800mV nominal

**DC Offset:** 0V  $\pm$ 0.5V

**Rise and Fall Time:** 200ps nominal

**Overshoot:** <10% of amplitude

**Return Loss:** > 15 dB up to 1 Gb/s, > 12 dB up to 1.5 Gb/s

**Wide Band Jitter:** < 0.2 UI (reclocked)

#### 3.3. ELECTRICAL

**Voltage:** + 12VDC

**Power:** 5 Watts.

**EMI/RFI:** Complies with FCC regulations for class A devices.  
Complies with EU EMC directive.

### 4. STATUS LEDS

**MODULE OK** This Green LED will be On when the module is operating properly

**LOCAL FAULT** This Red LED will be On when input video is lost or when there is a fault in the module power supply.

**CARRIER PRESENT:** This Green LED will be On when there is a valid signal present at the module input.

**CABLE LENGTH WARNING:** This Yellow LED will be On when the cable equalizer detects that the cable length is greater than a preset threshold. (factory set for 125 meters of Belden 1694 or equivalent cable). See section 5.3 for information on adjusting the cable equalizer warning threshold.

## 5. JUMPERS AND USER ADJUSTMENTS

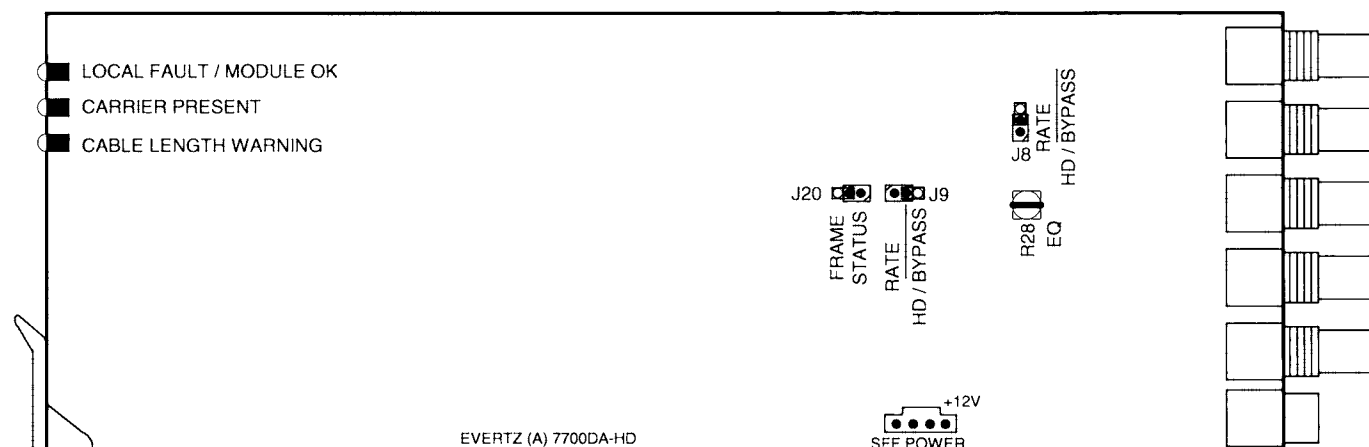


Figure 3: Jumper Locations for Rev A and Rev 1 DA Cards

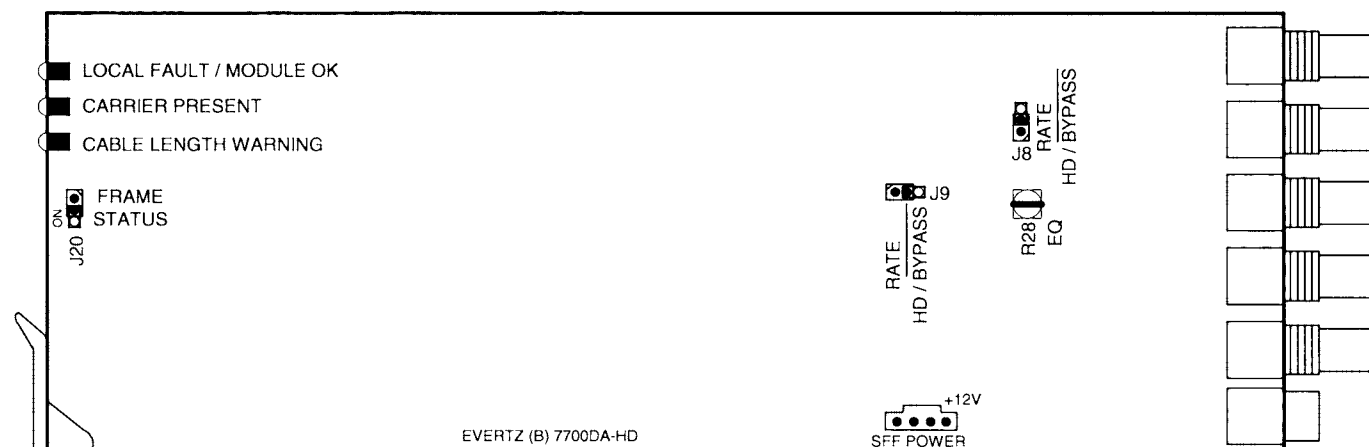


Figure 4: Jumper Locations for Rev B DA Cards

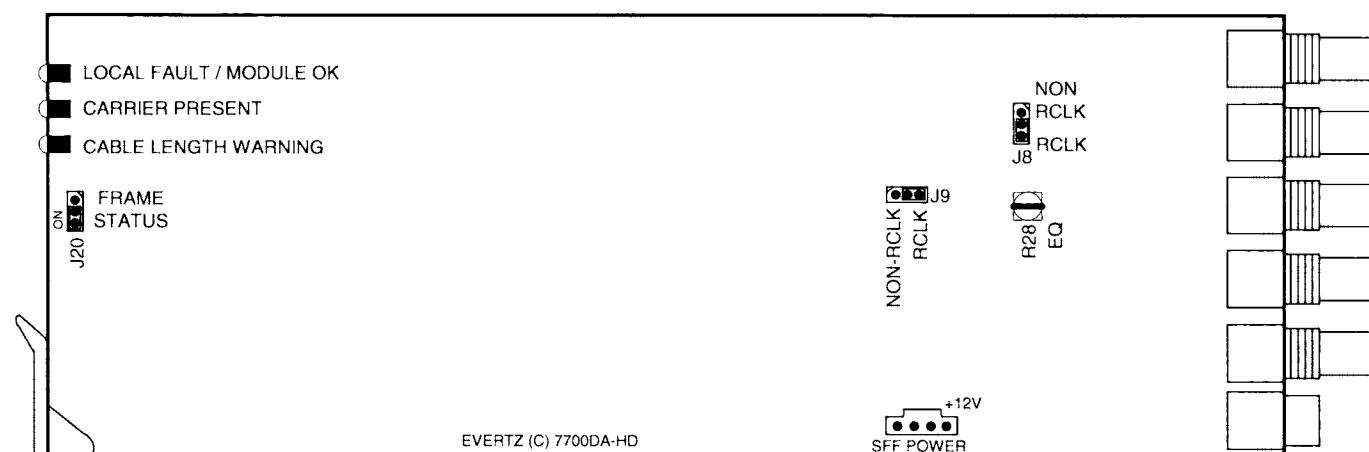


Figure 5: Jumper Locations for Rev C DA Cards

Note: On 7700DA8-HD jumpers J8 and J9 are installed on the rear of the main card



## 5.1. SELECTING RECLOCK OR NON-RECLOCK MODE

There are two jumpers J8 and J9 that determine whether the module will operate as a reclocking distribution amplifier with SMPTE 292M (1.5 Gb/s) video signals or as a non-reclocking distribution amplifier with other data rates.

For the A and B revision of the board:

**HD / BYPASS** To select the normal reclocking mode remove both of these jumpers. For convenience you may re-install the jumper so that only one side is connected.

To select the non-reclocking mode install both of these jumpers.

For the C revision and later of the board:

**RCLK/NON-RCLK** To select the normal reclocking mode put both of these jumpers in the *RCLK* position. To select the non-reclocking mode install both of these jumpers in the *NON-RCLK* position.

## 5.2. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper located at the front of the module determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

**FRAME STATUS** To monitor faults on this module with the frame status indicators (on the PS FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position. On Rev A and B boards install the jumper. (default)

When this jumper is installed in the Off position local faults on this module will not be monitored. On rev Rev A and B boards remove the jumper and re-install it so that only one side is connected.

## 5.3. SETTING THE EQUALIZER WARNING THRESHOLD

The EQ trimpot R28 located near jumper J8 is used to set the threshold of the cable equalizer warning. The equalizer warning is factory set to 125 meters of Belden 1684 cable, but may be adjusted for other cable types or cable lengths. To adjust the cable equalizer warning threshold, connect a signal to the input of the DA using the required length of cable. Adjust the trimpot slowly until the Equalizer warning LED comes on. You can verify that the equalizer warning is operating correctly by removing a few meters of cable from the input. The LED should go off.

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## **REVISION HISTORY**

<b><u>REVISION</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>DATE</u></b>
1.0	Original Version	June 99
1.1	Added drawings to show location of jumpers	Aug 99
1.2	Added section on adjusting the EQ threshold, Bypass mode now called non-reclock mode, Figures 1,3,4 updated	Sept 99
1.3	Added information on 7700DA8-HD 8 output DA, Added jumper locations for Rev C board (Figure 5 added) Specifications updated	July 00

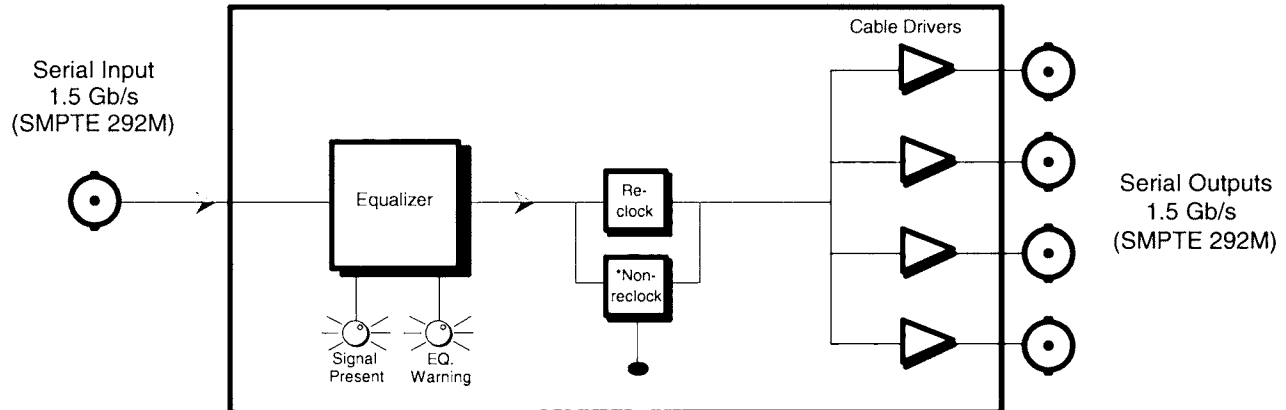
## 1. OVERVIEW

The 7700DA-HD Distribution Amplifier provides an economical method of distribution for your SMPTE 292M (1.5 Gb/s) HDTV serial digital signals. The 7700DA-HD has been designed to be used primarily as a reclocking 1.5Gb/s distribution amplifier, however, it can also be used as a non-reclocking SMPTE 292M, SMPTE 310M (19.4 Mb/s, or 45 Mb/s), DVB-ASI, or SMPTE 259M(143 to 540 Mb/s) distribution product. The DA's come in two versions.

Model	Total Outputs	DVB-ASI Compatible Outputs	Slots
7700DA-HD	4	4	1
7700DA8-HD	8	6	2

### Features:

- Reclocking mode for SMPTE 292M (1.5 Gb/s) signals
- Non-reclock mode for SMPTE 292M, SMPTE 310M (nominal 19.4 Mb/s), SMPTE 259M (143 to 540 Mb/s) or DVB-ASI, or any other bit rate less than 1.5 Gb/s
- Fully hot-swappable from front of frame with no BNC disconnect required
- Polarity maintained from input to output for DVB-ASI applications (only outputs 1,2,3,4,5 and 7 on 7700DA8-HD)
- Automatic cable equalization to 130 m
- Tally output on Frame Status bus upon loss of input signal



\*Note: Non-reclock Mode will operate 19.4 Mb/s to 1.5 Gb/s.

**Figure 1: 7700DA-HD Block Diagram**

## 2. INSTALLATION

The 7700DA-HD comes with a companion rear plate that has 5 BNC connectors. The 7700A10-HD comes with a companion rear plate that has 9 BNC connectors and occupies two slots in the frame. For information on mounting the rear plate and inserting the module into the frame see the 7700FR chapter section 3.

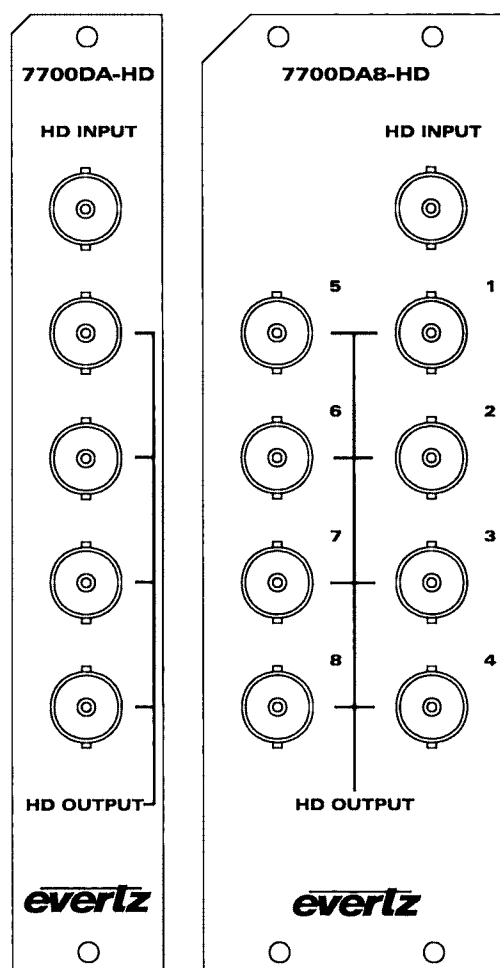


Figure 2: Rear Panels

**HD INPUT** Input BNC connector for 10-bit serial digital video signals compatible with the SMPTE 292M standard.

**HD OUTPUT** 7700DA-HD: There are four BNC connectors with reclocked serial component video outputs, compatible with the SMPTE 292M standard. All outputs maintain the same polarity as the input and are DVB-ASI compliant in non-reclock mode.

7700DA8-HD: There are eight BNC connectors with reclocked serial component video outputs, compatible with the SMPTE 292M standard. Outputs 1, 2, 3, 4, 5 and 7 maintain the same polarity as the input and are DVB-ASI compliant in non-reclock mode.

### 3. SPECIFICATIONS

#### 3.1. SERIAL VIDEO INPUT:

**Standards:**

**Normal:** SMPTE 292M

**Non-Reclock Mode:** SMPTE 292M, SMPTE 310M (MPEGTX 19.4 & 40Mb/s) or  
SMPTE 259M A, B, C, D,  
DVB-ASI or any other bit rate less than 1.5 Gb/s

**Connector:** 1 BNC per IEC 169-8

**Equalization:** Automatic 130m @ 1.5Gb/s with Belden 1694 or equivalent cable

**Return Loss:** > 15 dB up to 1 Gb/s, > 12 dB up to 1.5 Gb/s

#### 3.2. SERIAL VIDEO OUTPUTS:

**Number of Outputs:** 4 Per Card. (7700DA-HD, all outputs 1, 2, 3, 4, 5 and 7 are DVB-ASI compliant  
8 per card (7700DA8-HD) outputs 1, 2, 3, 4, 5 and 7 are DVB-ASI compliant

**Standards:** same as input

**Connectors:** BNC per IEC 169-8

**Signal Level:** 800mV nominal

**DC Offset:** 0V  $\pm$ 0.5V

**Rise and Fall Time:** 200ps nominal

**Overshoot:** <10% of amplitude

**Return Loss:** > 15 dB up to 1 Gb/s, > 12 dB up to 1.5 Gb/s

**Wide Band Jitter:** < 0.2 UI (reclocked)

#### 3.3. ELECTRICAL

**Voltage:** + 12VDC

**Power:** 5 Watts.

**EMI/RFI:** Complies with FCC regulations for class A devices.  
Complies with EU EMC directive.

### 4. STATUS LEDS

**MODULE OK** This Green LED will be On when the module is operating properly

**LOCAL FAULT** This Red LED will be On when input video is lost or when there is a fault in the module power supply.

**CARRIER PRESENT:** This Green LED will be On when there is a valid signal present at the module input.

**CABLE LENGTH WARNING:** This Yellow LED will be On when the cable equalizer detects that the cable length is greater than a preset threshold. (factory set for 125 meters of Belden 1694 or equivalent cable). See section 5.3 for information on adjusting the cable equalizer warning threshold.

## 5. JUMPERS AND USER ADJUSTMENTS

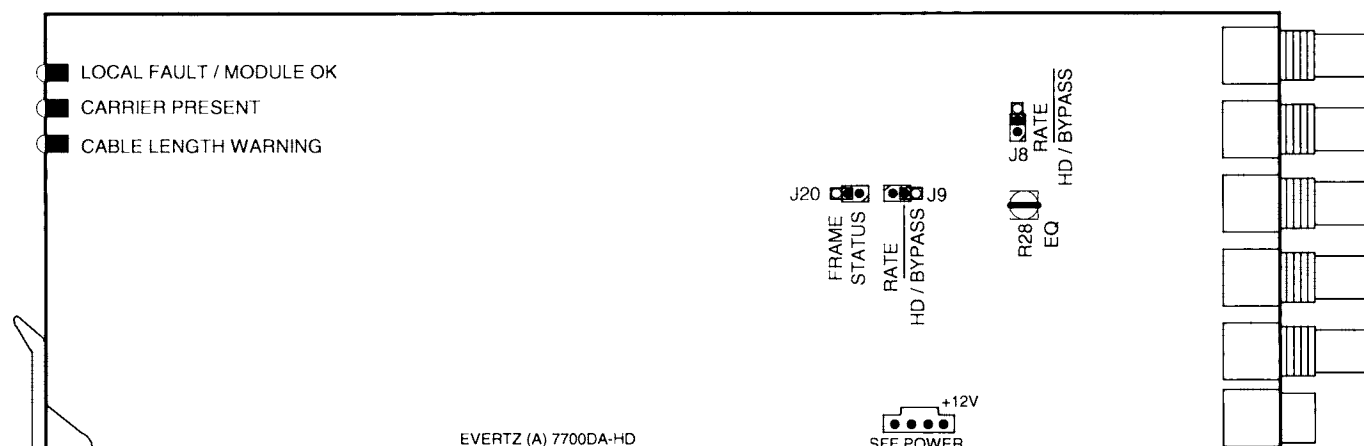


Figure 3: Jumper Locations for Rev A and Rev 1 DA Cards

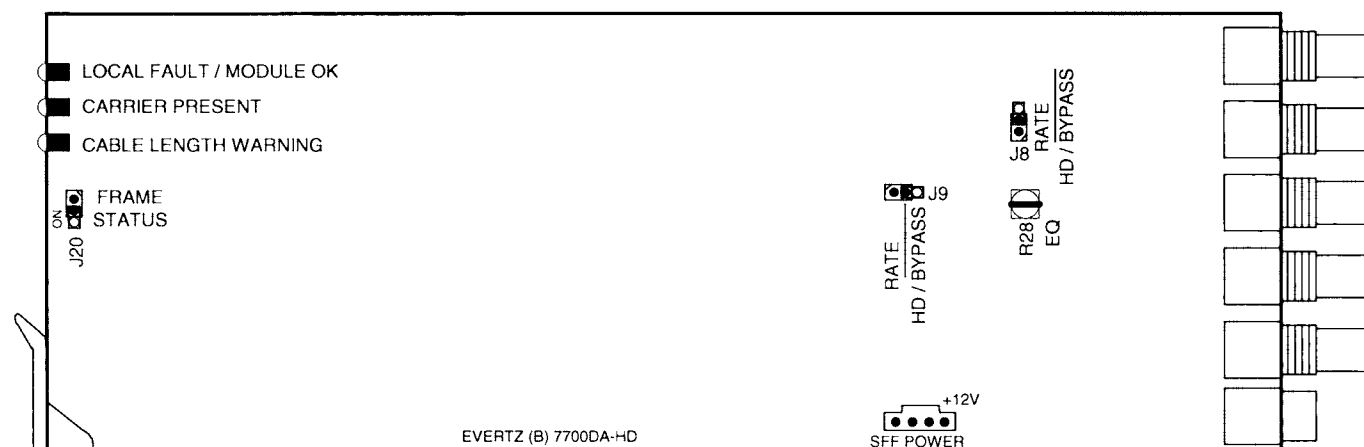


Figure 4: Jumper Locations for Rev B DA Cards

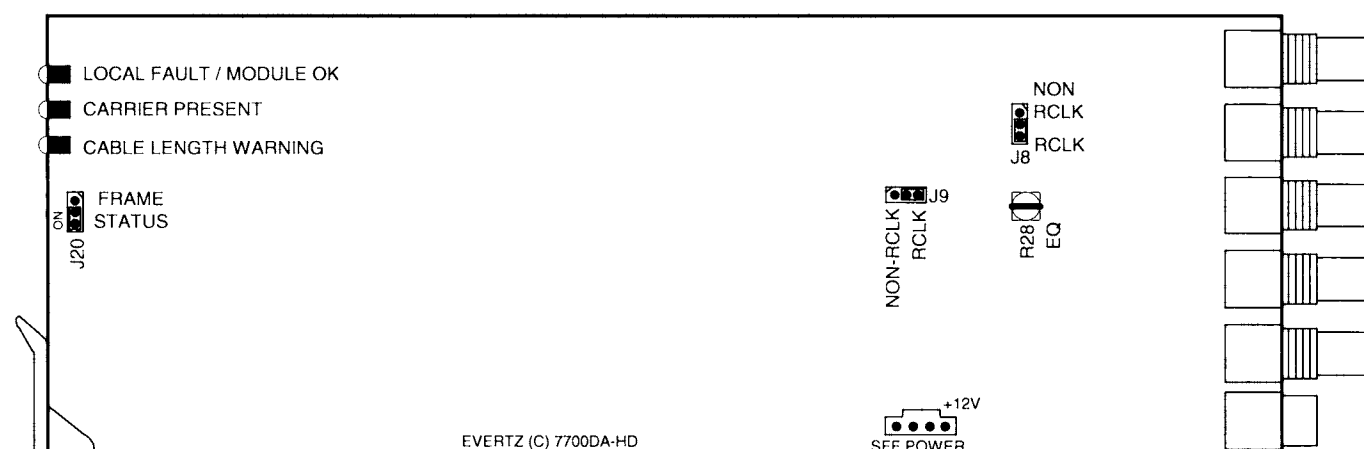


Figure 5: Jumper Locations for Rev C DA Cards

Note: On 7700DA8-HD jumpers J8 and J9 are installed on the rear of the main card



## 5.1. SELECTING RECLOCK OR NON-RECLOCK MODE

There are two jumpers J8 and J9 that determine whether the module will operate as a reclocking distribution amplifier with SMPTE 292M (1.5 Gb/s) video signals or as a non-reclocking distribution amplifier with other data rates.

For the A and B revision of the board:

**HD / BYPASS** To select the normal reclocking mode remove both of these jumpers. For convenience you may re-install the jumper so that only one side is connected.

To select the non-reclocking mode install both of these jumpers.

For the C revision and later of the board:

**RCLK/NON-RCLK** To select the normal reclocking mode put both of these jumpers in the *RCLK* position. To select the non-reclocking mode install both of these jumpers in the *NON-RCLK* position.

## 5.2. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper located at the front of the module determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

**FRAME STATUS** To monitor faults on this module with the frame status indicators (on the PS FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position. On Rev A and B boards install the jumper. (default)

When this jumper is installed in the Off position local faults on this module will not be monitored. On rev Rev A and B boards remove the jumper and re-install it so that only one side is connected.

## 5.3. SETTING THE EQUALIZER WARNING THRESHOLD

The EQ trimpot R28 located near jumper J8 is used to set the threshold of the cable equalizer warning. The equalizer warning is factory set to 125 meters of Belden 1684 cable, but may be adjusted for other cable types or cable lengths. To adjust the cable equalizer warning threshold, connect a signal to the input of the DA using the required length of cable. Adjust the trimpot slowly until the Equalizer warning LED comes on. You can verify that the equalizer warning is operating correctly by removing a few meters of cable from the input. The LED should go off.

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